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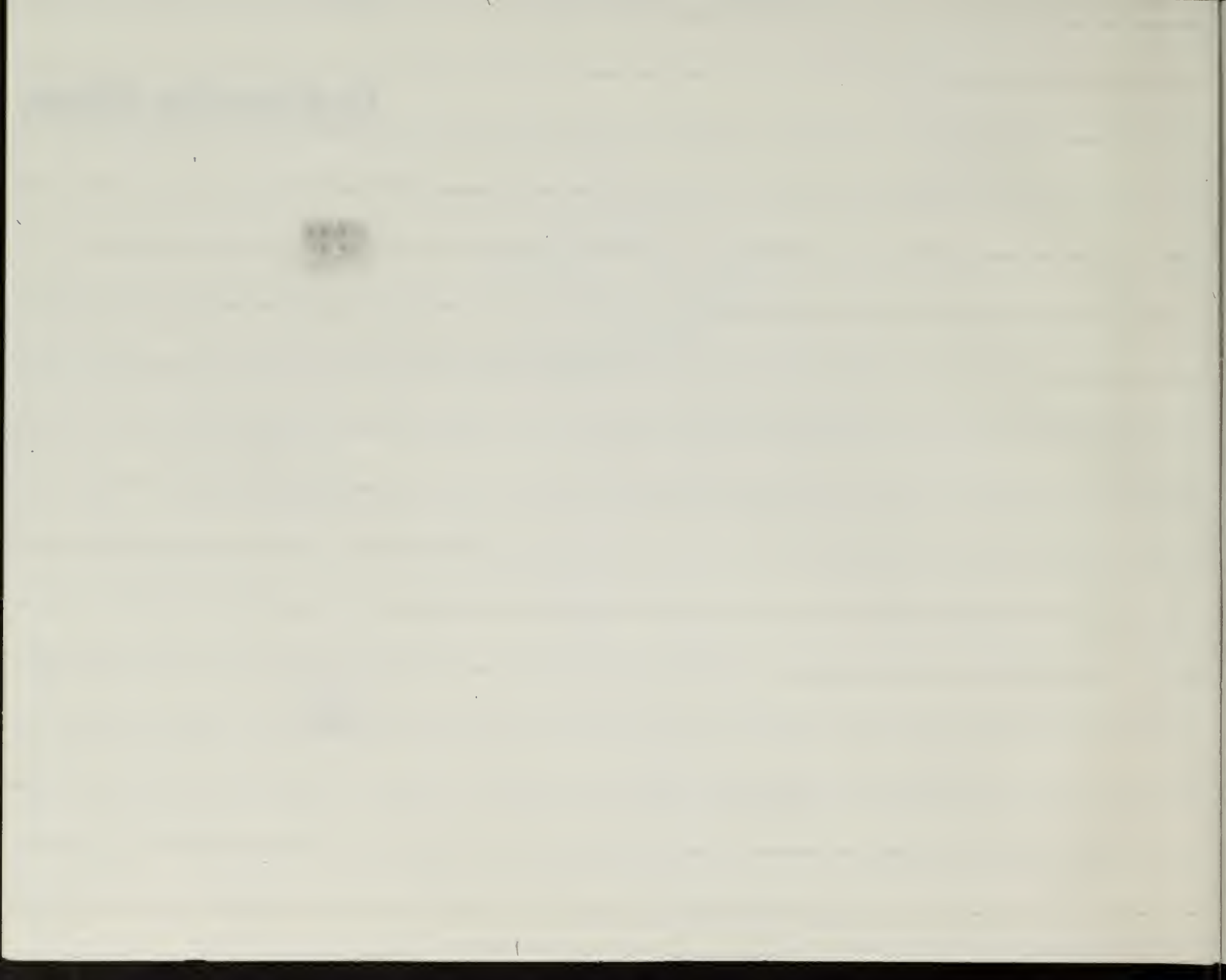
CENTER REVITALIZATION MANUAL

A Guide to Improving Your Downtown

METRO-OLITAN AREA PLANNING COUNCIL

912/25

Introduction



An economic analysis is usually done next to identify commercial problems and opportunities. Most land-use, parking, traffic and design proposals are based on market information so it is important that this analysis be done early in the project. An economic or market analysis provides information on customers, competition, retail mix, current market conditions, and market potentials. Its dollars and cents perspective enables the committee to make economically sound decisions about all aspects of a center-revitalization project.

With base data from a land-use and economic analyses, parking, and traffic problems are then examined. Two of the most frequently encountered complaints in town centers are parking and traffic. The two are closely related. The parking analysis should have a commercial objective--converting a driver into a shopper. Traffic analysis must examine problems of congestion, safety, and traffic flow. Both analyses should aim to meet the needs of a town center as a shopping and living area, not a through-highway, and recommendations must be compatible with overall project goals and objectives.

Analyzing the design of a business district, usually done last, is one of the most critical elements of the center-revitalization process. The objective of center revitalization--upgrading a business district--is often accomplished largely through design improvements. A center must be safe, convenient, comfortable, and attractive in order to be a commercial success. Through a visual study of buildings, sidewalks, amenities, and landscaping, recommendations for improving the appearance and functioning and thus the marketability of a center, can be made.

The committee must decide on final recommendations once the necessary analyses have been completed. Priorities for implementing the recommendations should be based on available funding and potential impact. For example, it is often possible to make low-cost cosmetic improvements to storefronts and sidewalks that can quickly change the appearance of a town center. Such improvements show progress and can provide momentum while funds are sought for more costly and long-term improvements like new roads or parking lots.

The following pages describe in much greater detail these ideas for organizing, analyzing, and implementing improvements in a business district. It is important to remember throughout the center revitalization process that problems must be clearly identified and goals established before economically realistic objectives for downtown improvements can be set.

Center revitalization refers to the process of upgrading a business district both physically and economically. Since business districts are essentially public places--with stores, roads, parking lots, parks, and institutions serving various public needs--their problems require public attention and solutions require cooperation of diverse interest groups. Problem-solving therefore must be a coordinated effort. Techniques for organizing such an effort and implementing a center-revitalization program are outlined in this manual.

The formation of a project committee is the first-step in a center-revitalization process. To ensure consideration of the varied issues in a downtown, a diverse membership is needed and representation should be balanced according to project emphasis. It is helpful to have the committee recognized by the local officials who are important to project implementation. The committee is responsible for overall project direction, including assigning or hiring a project manager, managing the budget, defining the project area, setting goals and objectives, selecting consultants to do technical studies (traffic, parking, marketing, and design), reviewing the analyses, endorsing final recommendations, and keeping the general public up-to-date on project activities. A good committee is essential to the success of a revitalization project.

Since most projects operate on limited budgets, it is important that problems and assets be identified by the committee early in the center-revitalization process. Priorities should be set so that critical problems and those most likely to be solved, can be studied first. Once this has been accomplished, technical analyses can begin. A land-use analysis, usually done first, studies the physical characteristics of and activities within the business district. All parcels are inventoried, categorized, and analyzed; zoning, compatible-use and space-demand problems are examined. The final recommendations should include suggestions for both improving existing land-uses and planning for the future of undeveloped or underdeveloped parcels.

This is manifested in vacant stores, decreased sales and merchandise selection, deteriorating storefronts, and deserted sidewalks. Combined with chaotic traffic and parking patterns, these complex problems require coordinated solutions.

It is to the plight of the central business district that this manual is dedicated. The manual is designed to address the varied problems faced by many city and town centers in eastern Massachusetts. As the regional planning agency for the metropolitan Boston area, the Metropolitan Area Planning Council (MAPC) has developed a program for center revitalization. This manual provides the information necessary for a town to approach problems of marketing, traffic and parking, and urban design, and is based on methodologies developed as part of MAPC's extensive work on center revitalization projects in the Boston metropolitan region. Intended to help town officials and planners recognize avenues for both defining and pursuing a project, the manual cannot be regarded as a complete, comprehensive "how to" manual. Rather, the manual may be used as a source of inspiration and general understanding of the revitalization process.

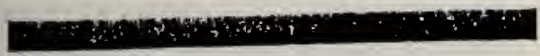
Introduction

Eastern Massachusetts has a proud heritage. Its coastline, rivers, plains, and mountains give it geographic diversity and beauty. Its history gives its cities and towns beautiful buildings and places of national interest and significance. And its people give it the "Yankee" tradition of independence of mind and will. Geography, history, and people have combined to make the centers of Massachusetts communities unique and important to the cultural, political, and economic functioning of the region as a whole.

New England towns typically grew around the coast and rivers -- the natural point of trade, commerce, and manufacturing. Most New England towns were constructed by people sensitive to the topography and landscaping of the area, resulting in town centers rich in vegetation, open space, and vistas. The focal point of these early towns was traditionally the "town common" -- an area of open space around which most political, social, economic, and spiritual meetings took place. Roads were routed around the common and foot-paths through it. A church usually stood at one end of the common and a town hall at the other. An assortment of beautiful shops and homes filled in between and a self-contained community was developed.

Today, eastern Massachusetts continues to grow and develop, despite the increasingly strong lure of the American south and southwest. The attractiveness of its older cities and towns, combined with its history, educational and medical facilities, strong economic base, and proximity to a world-leading city have kept and attracted increasing numbers of people to New England despite rising costs of living.

With continued growth and development have come problems for town centers. New development like shopping malls, industrial parks, and interstate highways, has been demanding of land area -- a scarce commodity in older town centers. Mass marketing trends and increased dependency on the automobile also have hurt older town centers. As streets become more congested, parking harder to find, and space for commercial expansion more limited, many towns find that their traditionally strong town center is an economically troubled commercial district. As more industries, merchants and home builders leave small town centers for the open spaces of the suburbs, the character of the center changes.



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Credits

The Economic Development Department at MAPC produced this report with credits to the following:

PROJECT MANAGER: Robbin Peach

PRINCIPAL AUTHORS: Agnes Horigan Baker, Marketing
Michael Oman, Traffic and Parking
Robbin Peach, Urban Design

ASSISTANCE: Rick Shea, Land Use, Historic Preservation

PROOFREADING: Karen Houston

GRAPHICS: Dave Speidel
Barbara Pickles

TYPING: Christine E. Murtagh
Ladis P. Bernier

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John W. Connery: President of Community Revitalization Corporation

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1982-1983 MAPC Officers

Elizabeth A. Bransfield, President
William Sawyer, Vice-President
Frank E. Baxter, Secretary
Patricia Brady, Treasurer
Jonathan G. Truslow, Executive Director

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complete information is desired. These two or three basic parking studies may be supplemented with information developed in the shopper and business surveys to round off the picture of existing conditions.

PARKING INVENTORY

This is the most basic of all studies. It identifies the amount and location of existing parking and its relevant characteristics, i.e., applicable regulations, and/or time limits, meters, and public or private ownership. If a recent study has been done, this step may be shortened considerably by beginning with that work. However, it is still recommended that the information be at least field checked and updated.

The technique of the study is to map the number, location, and characteristics of all available parking in the town-center area onto a base map. Before beginning, it is necessary to carefully define the area to be surveyed. Although it will generally agree with the already defined project area, the area may exclude some parking at the edge of a town center because it tapers off in its relationship and use by the commercial core. Parking should be included in the inventory if it primarily serves some use located in the town center, even if it is not commercial (e.g. an existing factory or apartment building) since this is essential to evaluating adequacy of the parking provided.

To survey the parking a field team should be assembled, the size of which depends entirely on the size of the area and available manpower since results may be obtained over a considerable period of time. Marked spaces are then mapped on a large scale base map. Any interruption in a group of spaces should be noted, such as a fire hydrant at curb side, a taxi stand, or a fixed obstruction such as a light pole in a parking lot. Any significantly larger or smaller space should be noted. Metered or unmetered spaces with rate and time limit should be noted. Public vs. private ownership should be obtained from town records and/or local knowledge (e.g. assessor's office).

Town centers, frequently have areas of "ad hoc" parking, or formal parking areas in such disrepair that they do not operate like a striped lot. In these cases, an estimate must be made of capacity. Usually, if an area is commercially relevant it will be occupied during normal

Parking is often the focus of downtown development efforts. It is the means by which a driver or passenger becomes a shopper. Parking must be easy to get to and easy to use, it must be attractive and near the stores, a shopper should feel secure, both in using an area and in leaving his/her car there, and it should be easy to find from the roadways and easy to find the stores from it. Even "drive up" services such as banks or restaurants have provisions for stopping the car and conducting business.

To reach these basic goals there are fairly straightforward steps: 1) the community must understand existing conditions, 2) the community must estimate the future demand for parking, 3) improvements must be devised to meet these conditions, and 4) the parking projects must be built.

EXISTING CONDITIONS

The entire process begins with an assessment of existing conditions. This is achieved through a number of studies, generally conducted in conjunction with the studies (traffic, market, visual, structural, etc.) described elsewhere in this manual. The studies of parking are designed to answer questions like: how much parking do we have and where is it located? How do people use our parking and what do they use it for? It is not enough to listen to miscellaneous complaints of "not enough parking", more must be known. How much parking is there? Where is it located? Is there enough parking except for special times or in a few places? Is the street jammed while a large, existing lot goes unused? This is normally achieved through direct studies of parking, and through results derived from other studies of traffic, and business and shopper characteristics.

Although there are many studies that may be made of parking conditions (i.e. counting parked cars along a selected block face, computerized license plate checks, and mail out interviews of every user of the town center), MAPC has identified two basic studies that are fairly straightforward and very informative. These are the parking inventory and the occupancy/duration count. To this may be added a cordon count if more



Parking & Traffic

for downtowns; a commercial area adjacent to a residential area that restrains traffic on residential streets, is well-landscaped, includes on-site parking, and has unobtrusive lighting and sufficient open space.

Alternative plans should be developed for the use of undeveloped land or for prospective changes to developed land. This goal-policy formulation state should be accomplished through committee hearings and public meetings. (The power to make laws and regulations concerning the activities of residents and their property is an accepted police power of a community in order to protect the health, safety, and welfare of all the people.)

These goals and policies should then be formalized and implemented through zoning and subdivision regulation.

MARKET ANALYSIS

A center-revitalization project is usually undertaken to help rejuvenate commercial activity in a downtown. To identify commercial problems and weaknesses, it therefore is crucial that some type of economic analysis be done.

In the technical-data marketing section, a technique for analyzing general economic conditions and specific retail activity in a downtown is presented. Ways to find out who shops in your downtown and why are explained, as is how to locate and evaluate competition, to survey business and study retail mix, and to measure current market conditions and identify market potentials. This method of evaluating economic activity is referred to as market analysis.

Because the purpose of a market analysis is to describe economic conditions, it is important that it be done at the beginning of a project. Identifying market constraints and opportunities early on is critical to the development of realistic solutions to all kinds of downtown problems, not just economic ones. Land use, parking, traffic, and design proposals must all be based on market information. The cost of improvements to storefronts, sidewalks, parking lots, etc. should be proportionate to their expected benefit. A market analysis helps a committee determine costs and benefits in an economic context.

The
Revitalization
Process

Most center-revitalization projects study broad problems on limited budgets. Because a market analysis can help a committee set economically realistic goals and objectives for redevelopment, it is a valuable tool for allocating scarce resources. In a situation where limited amounts of time and money are available to solve seemingly limitless problems, a market analysis can provide the proper economic perspective in which to make important decisions on revitalization.

PARKING AND TRAFFIC

Two of the most frequently encountered complaints about older town centers are parking and traffic. Serious enough in their own right, these two problems are probably among the principal causes of town centers' blight and decline. Built to serve the transportation needs of the nineteenth century, featuring compactness, narrow streets, and railroad stations, most towns of eastern Massachusetts are ill suited to the needs of the automobile.

The problems must be addressed by the downtown-revitalization effort if there is any hope of succeeding in effecting improvements. The issues of parking and traffic are closely intertwined. They must always be conducted together. It is the process of assuring that parking is adequately served by the roadways and that the roadways are adequately served by parking facilities that represents the public's most significant contribution to its commercial core. The outcome of one effect must always be tested against the goals of the other to assure success of the revitalization effort.

PARKING

Parking analysis should be oriented to the basic parking function -- converting a driver into a shopper. Spaces should be easily accessible, sufficient in number, and pleasantly designed. Access to the principal pedestrian areas should be convenient and attractive. This usually will take place in new or improved off-street lots, but may be oriented toward on-street facilities.

The basic steps in improving parking conditions are 1) adequate studies of existing conditions to establish availability of parking and how it is used, 2) assessment of demand for parking generated by existing and potential business and other activities in the downtown area, and 3) designs of appropriate improvements to (usually) expand supply and make its use more convenient. These studies are conducted to assess the amount and location of existing parking, its use, rate of turnover, and availability.

In addition to existing conditions, the total demand for parking must be assessed based on existing and potential levels of activity. The orientation of parking to comparison or convenience trade and the general circulation system must be identified, appropriate walking distances must be observed and subareas of demand outlined. All these techniques are explained, in detail, in the technical-data parking section of the manual.

TRAFFIC

The basic pattern of analyzing traffic is much the same as that for parking, but is much more technically complex. It is important to remember that the nature of analysis should be specifically oriented to the needs of a town center as a shopping and living area rather than as a through-highway. This is important since most small town centers are located on one or more older through highways that have been bypassed by new super-highway construction. The nature of the improvements necessary to speed traffic through to destinations elsewhere is frequently at odds with that of those required to provide convenient access to shopping.

The studies and analyses required for traffic attempt to identify the problems and conditions for which improvements will be developed. Accurate maps of existing facilities must be developed; total volumes of traffic and specific turning movements must be assessed. Existing capacities of intersections should be evaluated and used to identify points of excessive congestion and their causes. Safety issues for the entire downtown must be identified.

The Revitalization Process

From this base, it is possible to develop improvements. The overall circulation system should be considered, including possible one-way circulation and street extensions and/or closings. Sometimes bypasses may be considered, and certainly improvements to intersections, traffic signals, parking limitations, and other regulations should be explored. These also are outlined in some detail in the technical traffic section of this manual.

URBAN DESIGN

Analyzing the design of an urban center usually includes a visual study, as well as studies of the center's buildings, pedestrian circulation patterns, amenities, and landscaping. Discussed in the technical data section, these major analyses are very important. A center can be underutilized or inefficient if not designed properly, even if adequate land uses, traffic-circulation patterns, parking, and marketing exist. A center must be safe, convenient, comfortable and inviting, and design techniques can help accomplish this.

Visual analysis, a study of the visual design and character of the center, focuses on the overall impression or image the center portrays. This image can suggest a positive inviting or negative "avoid-me" message to a potential customer or resident. The size, form, design, and maintenance of the town's business district infer the type and quality of merchandise one can expect to find there.

Buildings are the most visual component of a town. Analysis of a center's architecture is therefore closely related to a center's visual analysis. The appearance of an individual building or row of buildings, tells much about the center's history and present status. Beautiful old buildings that are vacant or in shoddy disrepair imply an economic decline of a once-stable or prosperous center. Architectural style, historic significance, structural soundness, and condition of a building's storefront and signs are important studies of the architectural analysis.

And the needs of the pedestrian are as equally important as building condition or visual images. Studying the sidewalk system on main streets, and through alleys, parking lots and open space, the pedestrian circulation analysis discovers the convenience, safety, and comfort of a town center for a pedestrian. Attractively landscaped walks with places to sit near major activity areas invite people to visit and shop in a town center.

The bulk of urban design analysis often must wait until land use, marketing, traffic, and parking studies are complete. The use of land directly effects buildings, and the street and parking layouts directly determine sidewalk placement. Urban-design issues should be closely considered in the other analyses to ensure a compatible, well-designed, and efficient functioning downtown center.■

Conceptualization

The Revitalization Process

As a revitalization project analyzes a town's problems and potentials, patterned relationships are discovered, and ideas about dealing with those relationships are formed. Ideas about making an area function or look better are constantly evolving. These ideas are called "concepts" -- proposed ideas or plans that state, in a general way, a direction or solution to pursue. Many possible solutions exist for each problem, and eventually the committee must choose a solution which meets the community's goals, as well as the projects's budget, time constraints, and concerns for social, political, and environmental impacts. Careful evaluation of needs, land use patterns, services, and technical requirements is needed. For example, one town interested in developing its open space might choose to build a recreational park because of environmental and social priorities. Another town, given the same open space might choose to develop it commercially because of economic marketing priorities. Whatever concepts are chosen for land use, marketing, traffic, parking, and urban design, they must all be compatible with one another.

A combination of all chosen concepts become a comprehensive conceptual plan for the revitalization of the town. It is important that the committee gather as much public and municipal support for this plan as possible. Town officials, businessmen, and local citizens should have been involved in the decisions that led to the choice of concepts, so their endorsement of the final plan is a logical and essential step. This plan will be the framework for detailed recommendations and detailed designs that will revitalize the downtown center.

RECOMMENDATIONS

Recommendations are commitments to chosen concepts. Recommendations follow conceptualization and they are the last steps before implementing the revitalization project. From the recommendations, working drawings are produced and policies are formed. Pursuing money for implementation is based on stated recommendations.

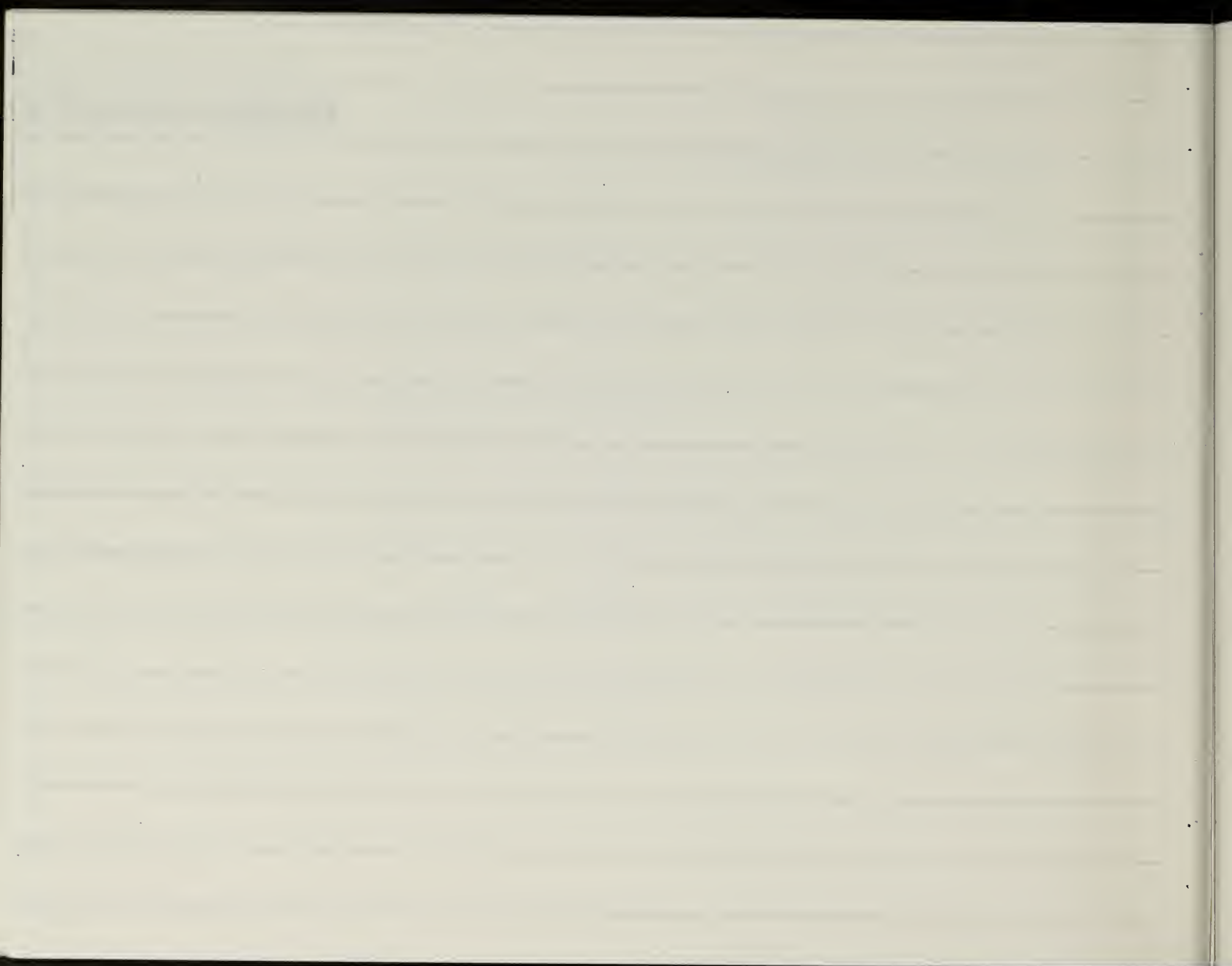
Professional assistance will be needed to make the detailed recommendations reality. Geometric layout of roads, parking lots, sidewalks, and lighting require detailed drawings. And architectural renovations, landscaping, and placement of pedestrian amenities benefit from the counsel of a professional. Policy concerns such as zoning, land use, and design standards need official endorsement. The committee can make recommendations, but professional and government assistance is needed to implement the project.

The entire center-revitalization process should be documented, showing clear reasons for recommendations. This facilitates public acceptance and official endorsement of the proposed plan. It also helps future generations understand the results of the project. The most thorough form of documentation is a report with text, maps, charts, graphs, and illustrations explaining the project in detail. The entire process from problem and asset identification through analysis, conceptualization, and recommendations should be thoroughly explained. The report and accompanying materials should be widely distributed after adoption by appropriate officials. If printing costs restrict wide distribution of the report, a distributed poster is a good alternative. A poster, or some other helpful graphic that summarizes the project is always popular with citizens who might not take the time to read a report. Posters are also good for stimulating needed public enthusiasm and support of a project.

However documentation of the project is accomplished, the recommended plan should be highly publicized and made easily available for anyone interested. ■

THE
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OF
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Implementation



Implementation

The hours spent on problem and asset identification, analysis, and concept formation mean nothing if the final plan is never put into place. It is the actual implementation of a project that makes all the energy and enthusiasm put into a center-revitalization project worthwhile. A plan that gets forgotten on a shelf is, unfortunately, just another stack of paper.

It is a committee's responsibility to see that a project's plan gets implemented in a reasonable and efficient manner. They, the committee, may need to form a special subcommittee to be involved strictly with implementation, and they may need to consult with specialists such as local development corporations, bank consortiums, preservationist groups and, of course, town officials. The original committee is responsible to get the ball rolling and hopefully oversee the project to its end.

A task of the committee will be to review the implementation of the project in respect to timing, costs, and needs of the community. The long-term aspects of the project, those that will take the longest, should be compared to shorter-term aspects. Fairly detailed cost estimates of various jobs in the project should be compared to each other and then compared with available funds. And the needs of the community and any scheduled individual construction projects should be compared to the goals and objectives of the project. After all these comparisons have been made, the implementation of the plan should be categorized by phases -- what is most important to do first and what should be done next.

Sections of a plan that can be easily implemented, especially those that are very visual, such as landscaping or storefront improvements, should be done as soon as possible. A freshly painted pedestrian alley, a new row of trees, or a street closed on weekends for special events shows the community that the town is active and serious about the revitalization project.

It is extremely important to maintain public enthusiasm for a center-revitalization project, especially after the planning decisions have been made. A project that lags or gets hung-up in delays is soon forgotten, or at least put in the back of the average citizen's mind.

The Revitalization Process

Other ways to keep the project "alive" are to sponsor special events, like band concerts, festivals, and crafts fairs, promote the project with news media and newsletters, and advertise with colorful signs announcing a future construction site or taking credit for physical projects already implemented. A new sitting area, new sidewalks, a piece of sculpture, anything done by the initiative of the revitalization project should state so.

Many recommendations will take considerable time to implement. Public policies, for example, like master plans, zoning regulations or design standards take time to develop, have approved and implement. Funding must be sought for some recommendations, like a parking lot or new intersection and obtaining funds, hiring contractors and project construction can easily take more than a year. Other recommendations can only be implemented when market conditions are right. The development of a vacant parcel, for example, will depend on the timing of real estate transactions and the developer's schedule.

The recommendations that require public action, extensive funding or market coordination should be considered long-term. The committee must be persistent and aggressive in pursuing their implementation.

ECONOMIC DEVELOPMENT

Implementing economic development recommendations tends to take time as most require the proper market conditions, raising capital for investment, and private and public sector cooperation. There are a variety of state and federal incentives available for center revitalization projects as well as local programs and activities.

At the town level, a committee can ask local banks to form a low-interest loan pool for center improvements like new storefront facades or business expansion. A Chamber of Commerce can encourage development in a variety of ways -- from organizing downtown promotional schemes to seeking new businesses that would improve retail mix. And town government can target public works funds for sidewalk, street and parking-lot improvements in the business district that will make the area more attractive to shoppers.

In Massachusetts, state incentives for economic development are abundant. The CARD (Commercial Area Revitalization District) program makes qualifying commercial centers eligible for revenue bond financing and

parking-lot construction funds. The Community Development Block Grant (CDBG) program makes funds available for a variety of commercial revitalization activities including rehabilitation loans and business-development assistance. Several state agencies also exist to assist communities in development projects -- The Community Economic Development Assistance Corporation (CEDAC), the Community Development Finance Corporation (CDFC), and the Massachusetts Land Bank -- to name a few. Other state legislation, like Chapter 121-A, enables communities to attract development in blighted areas through negotiated tax agreements. A complete description of these and other state incentives to development in town centers is found in the Appendix.

There are also several federal programs for economic development. The Economic Development Administration (EDA) and the Small Business Administration (SBA) have been most actively involved in economic development. Their programs deal with increasing employment opportunities, public works improvements for economic development, technical assistance for economic planning, and assisting small business through guaranteed loans and business advice. Under the federal Economic Recovery Act of 1981, an Investment Tax Credit (ITC) may be deducted from the amount of taxes owed for qualified rehabilitation of buildings. Other federal agencies, like the Department of Housing and Urban Development (HUD) and the Farmer's Home Administration, also have economic development programs. More detailed descriptions of federal programs can be found in the Appendix.

PARKING AND TRAFFIC

Most center revitalization project committees are faced with solving transportation problems and financing their solutions. The work can be paid for through conventional loans or private financing if the improvements sought (such as the construction of a parking-lot) are undertaken as a private enterprise. More often, however, public improvements for crosswalks, on-street parking, roads and drainage systems require public financing. Improvements may be paid for with local municipal funds or funds from federal or state sources.

Federal Aid is available on any roadway developed with federal funds, according to the U.S. Department of Transportation. Most federal money, however, is available to local governments through the state or through regional transit authorities. See the Appendix for details on Federal Aid programs.

The Revitalization Process

On the state level, the Massachusetts Department of Public Works (DPW) within the Executive Office of Transportation and Construction is the primary agency responsible for transportation development. Thirteen regional planning agencies and eight district offices assist the DPW in planning, reviewing and monitoring transportation projects.

The Urban Systems program (formerly TOPICS) is one of the best programs for funding downtown roadway improvements. This program provides funding on a 75-25 basis. (The non-federal 25% normally being funded by the locality.) Eligible activities include reconstruction, realignment, sidewalk improvements and replacement parking. The state's Off-street Parking Program, Public Works Economic Development Program, and Community Development Block Grant (CDBG) program also fund traffic and parking improvements in commercial centers.

In addition, state aid to municipalities for highway purposes is provided by the Massachusetts motor fuel tax. The Commonwealth reserves 15 percent of this tax for distribution to municipalities under the "cherry sheet" and Chapter 90 improvements. This and other state transportation funding programs are described in detail in the Appendix.

Regulation and enforcement changes may frequently be implemented administratively. At the local level, improvements can be simply legislated or conveyed by instruction (as for police to strictly enforce a parking limit) to become in effect. In some cases new signs may be required but usually can be provided quickly.

If generally agreed upon plans are in place, it may be possible to program desired improvements into the Municipal Capital Improvements Budget or Maintenance Budget. Over several years significant changes can be made. Also, if special projects are undertaken such as a major drainage project or utilities relocation, reconstruction can be in accordance with the revitalization based plans.

URBAN DESIGN

Many of the federal and state programs listed above under Economic Development and Traffic and Parking fund public design improvements. As mentioned, the Community Development Block Grants and Urban Systems programs will support activities like sidewalk improvements. As has also been discussed, loan pools and Investment Tax Credits can be used

to encourage storefront renovations. Chamber of Commerces can be effective in raising money for improvements like tree plantings, benches, trash barrels or planters. And, of course, local government can be persuaded to improve the maintenance of sidewalks, roads, parks and other public amenities in a downtown.

Design guidelines, mandatory or optional, can be promoted by a center revitalization committee to guide the design of storefronts, landscaping or pedestrian amenities throughout a town. They do not seek to impose a uniform motif on all buildings or streets, but the intent is the establish a common set of guidelines which can be applied in a relevant fashion to individual buildings and streets. Guidelines ensure long-term serviceability of the town's center, improved legibility, and convenience to the visitor or prospective new tenant.

Design guidelines make sound economic sense. Improving the quality of storefronts and landscaping can increase property values and generate new business activity. By reducing image-damaging vacancies, attracting higher-renting tenants, and attracting purchasing customers, a town can hope to revitalize itself.

While design guidelines are most useful in helping the individual owner or businessman plan and design his own storefront or new building, improvements coordinated on an entire block will have an even greater impact. Upgrading an entire block or prominent set of buildings will usually coordinate and unify a street. The materials and equipment can be group or bulk purchased to reduce costs. The success of the guidelines depends on the merchant's participation.

The use of performance standards is another innovative technique that allows developers considerable leeway in designing and constructing new buildings. Developers must meet certain minimum-design standards related to lighting, security, building bulk, open space, and other categories. It is supposed to encourage unique designs, but there can be problems in administering the guidelines, because it requires more staff time to evaluate proposals and there may be more room for disagreement over what constitutes a good design.

See the Appendix for details on establishing a design review process.

The Revitalization Process

HISTORIC PRESERVATION

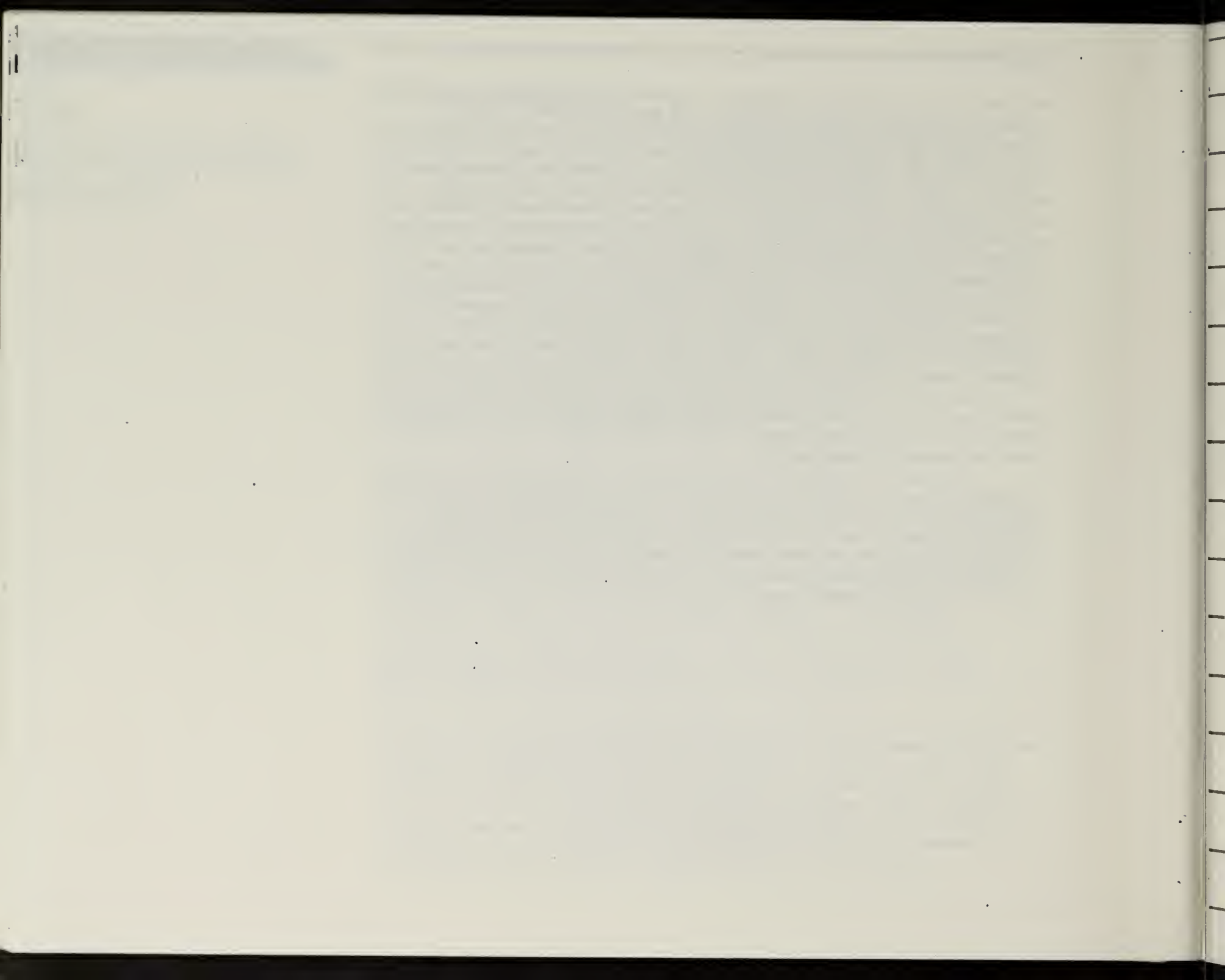
Over the last 15 years the historic-preservation movement has gained nationwide recognition. Media attention has been devoted to the back-to-the city phenomenon, and such phrases as "adaptive reuse" and "building rehab" have become familiar to thousands. The preservation movement successfully has shown that the rehabilitation and reuse of buildings are healthy for American cities and towns, both for their character and for their economic revitalization. It has been proven that, even individually, the reuse of old buildings costs less than new construction and, since it requires more energy to demolish and rebuild a new structure than to rehabilitate an old one, is more energy-efficient. Furthermore, the tax benefits from the preservation of buildings have been an inducement to more and more owners to rehab instead of demolish. Other benefits of historic preservation include an increase in investor interest in older areas; a greater tax base through the upgrading of structures; and an increase in city revenues from tourist dollars.

As cities mature, development pressures cause vacant lands to be built up. This demand for new space puts pressure on owners of historic properties to sell or redevelop, especially in urban areas, where sites in prime downtown locations may go through as many as three buildings in less than a hundred years. If a community intends to retain its historic character and that elusive quality of life, it must make planning for historic preservation a component of its normal planning. This means that residents, members of local historical commissions and societies, planners, and elected officials must reach a consensus of what in a town is worthy of preservation, and must take steps to see that it is preserved. See the Appendix for Preservation terms used in obtaining funds and becoming eligible for preservation tax incentives.

The first step for communities in planning for preservation is to complete the historic-resources inventory or survey, which identifies buildings, neighborhoods, and sometimes other features such as open space or vistas. This inventory is similar in some ways to other town-sanctioned surveys which catalog and evaluate natural resources such as open space, wetlands, and watershed areas. It should be used in the same way in evaluating resources threatened by development and helping local officials decide on what is worth saving.

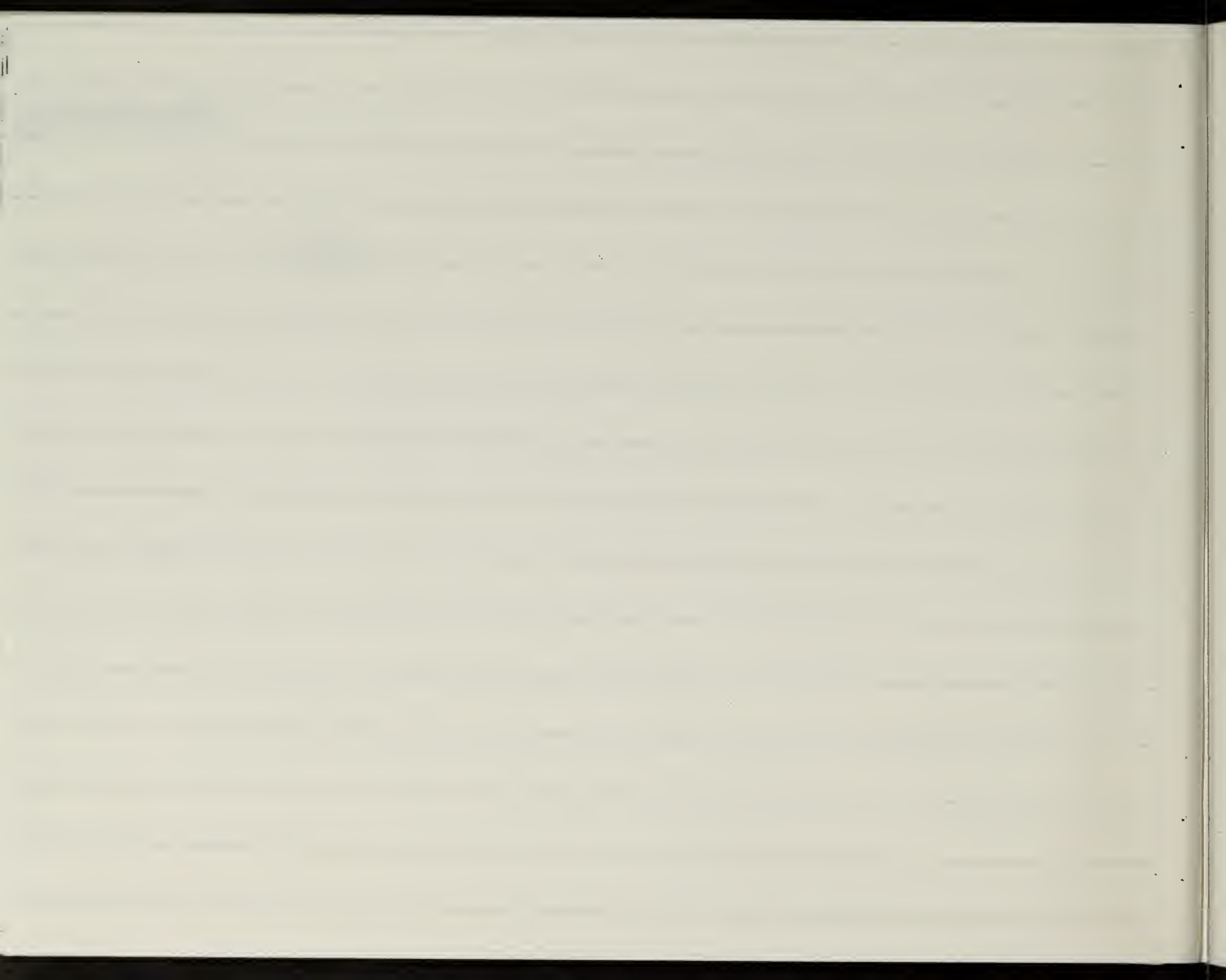
The federal government has formally advocated the preservation of historic sites since 1906. To date, the most important piece of federal legislation affecting preservation is the National Historic Preservation Act of 1966, which created the National Register of Historic Places. The National Register is the official list of the nation's cultural resources worthy of preservation. Listing makes private-property owners eligible for federal grants-in-aid through the state Historic Preservation Officer. It also provides protection through comment by the Advisory Council on Historic Preservation on all federal action affecting historic properties. Listings on the National Register are in the form of districts, sites, individual buildings, structures, or objects. Generally, buildings nominated to the National Register must be at least 50 years old, though exceptions can be made. The single most important criterion for listing is significance in American history, architecture, archeology, or culture. As an alternative to the National Register process, Massachusetts cities and towns, under Chapter 40C, may establish historic districts by a two-thirds vote of their city council or town meeting. (See the Appendix for details.)

Significant tax savings to encourage historic preservation were first enacted in 1976, in 1978, and in 1981. The latest version, the Economic Recovery Tax Act (ERTA) has continued some of the aspects of the earlier acts and done away with others. The legislation is expected to have a dramatic effect on spurring rehabilitation of the older cities and towns of the Northeast. ■



Technical Data

Marketing



A market analysis is an examination of socio-economic factors -- like population, income, and sales -- which define the market conditions of an area. While it is only one element of the revitalization planning process, a market analysis is important as it identifies and measures opportunities for growth in economic terms. Because it describes the level of business activity in a downtown, a market analysis can be used to make other decisions about land use, parking, traffic, and design.

A town center in the MAPC region typically is made up of retailers like drug and hardware stores, personal services like dry cleaners and beauty parlors, professional and financial services like banks and law offices, government services like a post office and the town hall, residences, and occasionally some manufacturers. While all are important to consider in a center-revitalization study, only retailers and personal and professional services are examined in detail in the type of market analysis described in this section.

Analyzing the market conditions of an area is a two-part process. Part one focuses on local market factors like demographics, trade-area definition, competing commercial areas, retail mix, and information on local businesses and consumer behavior. The second part is a more technical evaluation of these characteristics and examines trade-area expenditures and market opportunities.

The committee's role in a market analysis can be great or small. At a minimum, the committee is responsible for defining the project area; identifying major marketing problems like a high vacancy rate or shortage of customer parking; keeping merchants, local officials, and residents informed of study results; and deciding who will actually do the market analysis. If a committee chooses to hire a private consultant or planning group to do this work, then it must solicit proposals, select a candidate, and negotiate a contract for services. If a consultant is retained, the committee's role will be largely advisory. Because much of the information gathered and analyzed as part of a market analysis (like sales figures) is considered confidential, it is often better to have an outside professional group do the work. Local businessmen are reluctant to disclose financial information to town officials or fellow merchants.

Technical Data

Should the Committee decide to undertake the market analysis work on its own, members should be prepared to devote considerable time to this effort. A sub-committee should be formed and specific tasks assigned to individuals. Below is a description of each step of the market analysis process. ■

TRADE AREA DEFINITION

The region from which a downtown draws 80 to 85 percent of its business is known as the trade area. In most town centers, two distinct trade areas exist - a convenience trade area and a comparison trade area.

Typically, goods and services are defined as either convenience or comparison items. Convenience goods are those goods which consumers purchase in easily accessible or nearby stores. Drugs and food are examples of convenience items. Comparison goods are products which consumers purchase based on a comparison of price, selection, and quality, like apparel or furniture. Because people will travel greater distances for these items, comparison goods draw from a larger trade area.

The type of goods and services provided within a commercial district and the geographic accessibility of that district influence shopping patterns and are key factors in identifying trade area boundaries. For example, a small town center with only a few convenience stores would draw customers from a very limited area as would a town center located on a peninsula with only one access road. A town center located at a major crossroads, on the other hand, would have a large trade area, as would a downtown with many convenience and comparison stores.

Generally, a downtown's convenience trade area is no larger than the city or town it is in. Business and shopper surveys usually show that most shoppers come from this trade area and if your project area is extremely small or isolated this may be the only trade area you need to define. The comparison trade area covers a much larger geographic area and can include not only the town in which the center is located but each bordering town as well.

Highway access and boundaries such as a river or an interstate can prevent people from reaching the town center. Such physical limits should be carefully examined when determining the comparison trade area. If it appears unlikely that people in all or part of a neighboring town would shop in your town center, do not consider them in your trade area. If you include only part of a town, try to draw boundaries that follow census tracts as population and income are easier to estimate for census tracts than for other units. The map on page 50 is an example of how trade area boundaries were drawn for a market analysis study in Walpole, MA.

TRADE AREA CHARACTERISTICS

Essential to any market analysis are population and income figures. Current and historical statistics on population and per-capita income by community are relatively easy to obtain as both are published by the US Census Bureau.*

Because a market analysis examines growth potential, population and income projections are also needed. Population projections are published by MAPC in a report entitled Regional Decline or Revival: An Interim Population Forecast for the Boston Metropolitan Area 1980-2010. Income must be projected.

One way to project income is by extrapolation. To extrapolate, find the most current per-capita income figure available in the Census** (A) and one at least five-years previous to it (B). Adjust both figures (A and B) for inflation so they are in current dollars. (See Appendix for details on adjusting for inflation.) Find the difference between (A) and (B) and divide by the number of years between them, five if it is five years. This gives you the average annual increase in per-capita income (C). To project income, simply add that amount (C) to the base year (A) for each year you are projecting into the future.

EXAMPLE

If the Census shows that per-capita income in your town for 1980 was \$8,000 (A) and for 1975 was \$6,000 (B), then you know that per-capita income rose by an average of \$400 a year. $[(A)-(B)=\$2,000; \$2,000 \div 5 = \$400 (C)]$ Projected income for 1982 would then be \$8,800 $[(A)+2(C)]$ and for 1987 would be \$10,000 $[(A)+5(C)]$.

Population and per-capita income should be collected for each town within both the convenience and comparison trade areas. It is recommended that these statistics cover at least a 10-year period, including data five years into the past and projecting five years into the future. Remember

* 1980 Census of Population, US Department of Commerce, Bureau of the Census.

** Current Population Reports: Population Estimates and Projections, Department of Commerce, Division of the Census.

[illegible]

Convenience Trade Area



Comparison Trade Area

EXAMPLES:1975 POPULATION AND INCOME

	<u>Population</u>	<u>Per-Capita Income</u>	<u>Total Income</u>
Walpole	18,500	\$ 7,925	\$146,612,500
Wrentham	7,300	\$ 5,691	\$ 41,544,300
Norwood	31,200	\$ 8,177	\$255,122,400
Sharon	13,600	\$ 9,521	\$129,485,600
Foxboro	14,700	\$ 6,749	\$ 99,210,300
Medfield	10,000	\$ 9,064	\$ 90,640,000
Norfolk	6,000	\$ 6,728	\$ 40,368,000
Total Convenience Trade Area	18,500	\$ 7,925	\$146,612,500
Total Comparison Trade Area	\$101,300	\$ 7,927	\$802,983,100

1980 POPULATION AND INCOME

	<u>Population</u>	<u>Per-Capita Income</u>	<u>Total Income</u>
Walpole	18,800	\$ 8,471	\$159,254,800
Wrentham	8,200	\$ 6,042	\$ 49,544,400
Norwood	32,800	\$ 8,625	\$282,900,000
Sharon	16,000	\$10,203	\$163,248,000
Foxboro	17,300	\$ 6,980	\$120,754,000
Medfield	10,000	\$ 9,981	\$ 99,810,000
Norfolk	6,500	\$ 7,645	\$ 49,692,500
Total Convenience Trade Area	18,800	\$ 8,471	\$159,254,800
Total Comparison Trade Area	109,600	\$ 8,442	\$925,203,700

1985 POPULATION AND INCOME

	<u>Population</u>	<u>Per-Capita Income</u>	<u>Total Income</u>
Walpole	19,500	\$ 9,017	\$175,831,500
Wrentham	10,000	\$ 6,393	\$ 63,930,000
Norwood	35,000	\$ 9,073	\$317,555,000
Sharon	17,800	\$10,885	\$193,753,000
Foxboro	18,600	\$ 7,211	\$134,124,600
Medfield	10,200	\$10,898	\$111,159,600
Norfolk	7,200	\$ 8,562	\$ 61,646,400
Total Convenience Trade Area	19,500	\$ 9,017	\$175,831,500
Total Comparison Trade Area	118,300	\$ 8,943	\$1,058,000,100

Notes:

1. Convenience Trade Area includes only the Town of Walpole.
2. Comparison Trade Area includes Walpole, Norwood, Sharon, Foxboro, Norfolk, Medfield, and Wrentham.
3. All figures in constant dollars.
4. 1975, 1980, and 1985 population figures from Interim Population Reports: Population Estimates and Projections, Central Transportation Planning Staff, Boston, MA (1979). (This report has been replaced by Regional Decline or Revival, MAPC, Boston, MA 1982.)
5. 1975 per-capita income figures from: Current Population Reports: Population Estimates and Projections, Department of Commerce, Division of the Census, (November, 1979).
6. 1980 and 1985 per-capita income figures extrapolated.
7. Total Income = Population x Per-capita Income, except Total Comparison Trade Area Income which is the sum of the total incomes for each community in the trade area.

Other trade area information which is relatively easy to obtain and helpful to market analysis includes retail trends, employment characteristics, and data on housing construction.

RETAIL TRENDS

The Bureau of the Census publishes the US Census of Retail Trade and the US Census of Selected Service Industries every five years. These reports track business trends by community and provide data on number of establishments and sales for 10 major retail types and five major service categories. Growth trends in trade areas can be determined by analyzing this information. Below is a sample table with retail trend data from the Clifftondale Square Revitalization Project Report.

EXAMPLE:

RETAIL TRENDS IN SAUGUS 1972-77

<u>Business Group</u>	<u>Change in Number</u>	<u>Change in sales (\$1000) *</u>	<u>% Change in sales</u>
Hardware	- 2	+ 709	+ 16.1
General Merchandise	- 2	+ 2,692	+ 32.6
Food and Liquor	0	+ 11,930	+ 28.1
Automotive	- 3	+ 6,966	+ 29.1
Gas	- 6	+ 292	+ 2.9
Apparel and Accessories	+ 6	+ 2,963	+ 31.9
Furniture and Appliances	+ 2	- 3,135	- 40.0
Eating and Drinking	+ 4	+ 12,864	+ 33.0
Drugs	+ 1	+ 1,800	+ 66.5
Miscellaneous Retail ¹	-14	- 473	- 27.6
TOTAL	-14	+ 36,608	+ 15.2

* All dollars adjusted for inflation, that is, are all equal.

1. "Miscellaneous Retail" includes retail establishments not elsewhere classified, such as sporting goods, book and stationery stores, florists, and jewelers.

SOURCE: US Census of Retail Trade, Bureau of the Census, Washington, DC (1972 and 1977).

EMPLOYMENT

The Massachusetts Department of Employment Security (DES) has extensive employment information. Each year DES publishes employment levels by SIC code* for all Massachusetts cities and towns in Employment and Wages: Cities and Towns.

An examination of employment data may indicate that there are growing markets for retail trade or services in your community. For example, increased employment in the electronics industry, a field characterized by relatively high-salaried white collar workers, could signal an opportunity to open an additional restaurant in your town center that caters to business professionals. The table below illustrates how employment data can be organized.

EXAMPLE

Sector	EMPLOYMENT		Change Between 1970-78	
	1970	1978	Number	Percent
Agriculture	11	30	19	172.7
Construction	362	351	- 11	- 3.0
Manufacturing	553	581	28	5.1
Trans./Comm./ Utilities	112	329	217	193.8
Wholesale and Retail Trade	3564	4751	1187	33.3
Finance, Insur- ance, Real Estate	64	121	57	89.1
Services	688	688	-0-	-0-
TOTAL	5356	6850	1494	29.9

SOURCE: EMPLOYMENT AND WAGES: CITIES AND TOWNS: 1967-1978,
Massachusetts Division of Employment Security, Occupation/Industry
Research Department, December 1979.

* SIC code: Standard Industrial Classification code divides industries into major groups.

HOUSING

Data on housing construction is an important economic indicator. Building permit data by community can be found in Housing Authorized by Building Permits and Public Contracts: Annual, published by the US Bureau of the Census. The Areawide Housing Opportunity Plan, a 1979 MAPC publication, lists low and moderate-income housing construction and need by community. Local realtors and building contractors are other sources of housing information. New housing construction in a town center is extremely beneficial to commerce as it provides a local increase in trade area population.

CONCLUSION

Population, income, retail trend, employment and housing statistics should all be carefully examined. Shifts in the composition of population are important to note so that merchants can target sales to growing consumer groups. The same is true of employment. Trends in income may show that rising or falling sales should be anticipated. Retail trends can provide clues to changing marketing and buying habits and housing starts can pinpoint growing pockets of population. All are crucial to projecting market growth. ■

THE BUSINESS SURVEY

The purpose of a business survey is to identify the downtown's principle assets and problems from the businessperson's perspective. In addition to market information, data on land use, parking, traffic, and design is collected as part of this survey. The survey should be given to all businesses in the project area, including retail and service establishments. Results usually identify major problems and opportunities, findings that can be used to help analyze other market data.

ADMINISTRATION

Surveys can be sent and returned by mail, or hand-delivered and picked up. While the latter method is more time consuming, it is recommended. Delivering surveys in person usually yields a greater response, enables the surveyor to see each business in the downtown, and gives merchants an opportunity to ask questions. It is helpful to run a story on the project in your local newspaper before distributing surveys so that people will be expecting you. It is also suggested that a local merchant or someone familiar with shop owners, introduce the surveyor when questionnaires are passed out. Of course, a cover letter explaining the survey and assuring the confidentiality of responses should accompany each survey. Whether surveys are mailed or hand-delivered, the respondent should be allowed one week to complete the questionnaire. Make due dates clear in your cover letter. (See Appendix for sample cover letter.)

CONTENTS

Because you are soliciting mostly ideas in your business survey, the questionnaire should be kept simple and needn't be geared toward statistical accuracy. Depending on the scope of your revitalization project, you may have several different types of questions to ask. The survey should be tailored toward your project. Below are categories of questions that you may want to include.

- . Basic data which will be necessary to the overall market analysis

include: name and address of business, business (i.e. drug store, clothing store, beauty parlor, etc.), type of business (i.e. independent, local chain, national franchise), floor space including storage, number of years in business, ownership, annual rent if any, annual sales, sales trends, number of full-time and part-time employees and hours and days of operation.

- . General business questions can ask about customer residence, sex, and age; type of transportation used by customers; percentage of customers who work in the project area; and busy season, days and hours.
- . Questions concerning competition should ask for the name and location of major competitors.
- . If traffic and parking are part of your center-revitalization study, then information on employee parking, customer parking, and business deliveries should be sought.
- . Ample space should be provided for business opinions. Specific questions should address changes being considered by businesses, major problems in the project area, and positive characteristics of the downtown.
- . The shorter and more direct the survey, the better the response. Keep your questions simple and clear. Businesses are often reluctant to answer surveys because of one or two questions. Typical stumbling blocks are questions which ask for financial information, like sales or rents. If a businessperson is unwilling to answer certain questions, encourage him to fill out at least part of the survey. The purpose of the survey is to get local opinion on business conditions so partial responses are better than none. There are sample business surveys in the Appendix.

ANALYSIS

You should expect a 50 percent or greater response to the business survey. Responses can be tabulated by question and percentages are usually the best way to show results. Remember, all individual

responses must be kept confidential so it is important to report only aggregate figures. Be sure you do not publish any information which is the obvious response of a single business. Below is a sample of how data can be organized. A more detailed sample can be found in the Appendix.

EXAMPLE

NUMBER OF YEARS IN BUSINESS

Less than 2 years	5.0%
2-5 years	26.2%
5-10 years	18.0%
10-20 years	23.1%
Over 20 years	27.7%

SALES TRENDS (3 years)

Up (by an average of 24%/yr.)	71.7%
Constant	8.7%
Down (by an average of 13%/yr.)	19.6%

ANNUAL SALES

Range	\$5,600-\$1,000,000
Mean	\$ 251,000
Median	\$ 150,000

FLOOR SPACE

Range	250ft. ² -30,000ft. ²
Mean	1,530ft. ²
Median	1,000ft. ²

OWN/RENT

Own	23%
Rent	77%

ANNUAL RENT

Range	\$2,100/yr.-\$13,500
Mean	\$8,000/yr.
Median	\$5,700/yr.

PEAK SEASON

Fall	35.5%
Winter	32.9%
Spring	10.5%
Summer	21.1%

CUSTOMER RESIDENCE

Walpole	60.8%
Medfield	10.0%
Norwood	8.3%
Norfolk	6.6%
Foxborough	5.0%
Sharon	3.8%
Westwood	2.3%
Dover	1.0%
Other	2.2%

THE SHOPPERS SURVEY

Like the business survey, the shoppers survey is used to help identify key assets and problems in the project area, in this case, from the consumer's perspective. By asking patrons specific questions about themselves, their use of the downtown and their spending habits, the shopper survey can provide necessary information for a revitalization strategy. (See Appendix for example.)

Careful examination of survey results will yield valuable information on how your town center competes within its convenience and comparison trade areas. While results should not be used as statistical justification for specific improvements, they do provide local opinion and indicate what improvements may or may not be readily accepted by consumers.

ADMINISTRATION

There are several ways to conduct a shoppers survey-- by telephone, by mail, by running a questionnaire in the local newspaper, by leaving surveys at select businesses for customers to fill out, or by conducting personal interviews with shoppers in the downtown. Each method has its advantages and limitations.

- . By telephoning, a wide range of shoppers can be surveyed including those who do not shop in the project area, and a fairly good response rate is likely. Time and manpower are often your biggest problem in this type of survey.
- . Mail surveys also can reach a large segment of the trade-area population but are costly (unless sent as part of another town mailing) and the rate of return is generally low.
- . A newspaper survey can be an inexpensive way to survey (often space will be donated by the paper). It is easy to administer and reaches a broad audience. Like the mail survey, however, the rate of return generally is not good.
- . Leaving surveys at local businesses requires little manpower and can be quite effective. However, results can be skewed as people will be more willing to fill out a survey in some stores, like a restaurant where they are waiting for a meal, than in others, like

the drug store where they are running in to pick up a newspaper. An uneven picture of shopping activity may result.

While surveying shoppers on the street requires time, manpower and good weather, it is the recommended method for getting the best survey results in a center-revitalization project. Obviously, you miss surveying people who do not come to your town center but by actually interviewing those who do, you can gain valuable insight to local problems and opportunities. Interviews provide same-day results and an opportunity to explain and promote your project. People are usually more than willing to answer questions and provide opinions if the survey does not look too time consuming. Questionnaires should be kept to one page, easy to read, and able to be filled out without the assistance of the surveyor. Passing out surveys with pencils is the best technique for unbiased results. Surveyors should be stationed throughout the downtown near busy spots like the post office, supermarket, and bank. It is suggested that you survey twice, once on a busy weekday and once on a Saturday. The number of responses received, of course, depends on the size of your downtown. In a community center with over 100 businesses it is usually possible to collect about 150 responses a day (9AM-5PM) using four surveyors. If you need people to help survey, try contacting local community groups for volunteers. Passing out surveys requires no specific skills except smiling broadly.

CONTENTS

Like the business survey, the questions you ask shoppers will depend on the scope of your revitalization project. Below are the types of questions you may want to include.

- . To develop a customer profile you need to ask basic questions about age, sex, and residence .
- . To find out whether the town center is primarily a convenience or comparison shopping district ask questions about how often people come to the center, why they come, what specific products they are shopping for, and how much they usually spend. Short, frequent visits for convenience goods indicates a convenience center; longer, less frequent trips, and large purchases means more comparison shopping probably occurs.

- Find out where the competition is. Ask specific questions about where else people shop for convenience goods and comparison goods.
- If parking and traffic are part of your revitalization study, ask shoppers how they got downtown, where they parked, and how long they intend to stay.
- To pinpoint problems and assets, ask specific questions about major problems, change in the quality of the downtown, additional goods or services desired, and improvements that could be made.

ANALYSIS

Shopper surveys can be tabulated by question. Percentages are the best way to show results. Below is an example of how data can be organized. A more detailed example of shopper survey results is found in the Appendix.

EXAMPLE

FREQUENCY OF TRIPS TO DOWNTOWN WALPOLE

Daily	40.5%
More than once a week	32.1%
About once a week	19.1%
Twice a month or more	8.3%

REASON FOR COMING TO DOWNTOWN WALPOLE

To Shop	52.4%
To work	20.5%
For a professional service	54.8%
For a government service	25.7%

WHY DO YOU SHOP IN DOWNTOWN WALPOLE

Convenience	75.4%
Like the stores	9.8%
Like the services	10.4%
Other	4.5%

WHERE ELSE DO YOU SHOP FOR COMPARISON ITEMS

Walpole Mall	47.9%
Braintree	16.3%
Framingham/Natick	12.6%
Other	23.2%

WHERE ELSE DO YOU SHOP FOR CONVENIENCE ITEMS

Walpole Mass	53.3%
Norwood	10.6%
Medfield	6.5%
Other	17.1%

AMOUNT SPENT PER TRIP

Under \$10.00	44.4%
Over \$10.00	55.6%

MAJOR PROBLEMS IN DOWNTOWN WALPOLE

Parking	40.7%
Traffic	23.0%
Appearance	14.2%
Lack of Store Variety	39.2%
Other	7.5%

WHERE DO YOU LIVE?

Walpole	73.3%
Medfield	6.1%
Norfolk	3.5%
Other	17.1%

LENGTH OF STAY IN DOWNTOWN

Under 60 minutes	73.2%
Over 1 hour	26.8%

Competing Commercial Districts

There are three general types of commercial districts* that compete for shoppers' expenditures.

- Neighborhood centers provide for the sale of goods needed often -- convenience items such as food and drugs, and personal services. These centers are generally small, serve only their immediate area and contain a supermarket or food store.
- Community centers offer a much wider range of goods and services, including comparison items. These centers generally are the size of a community central-business district and have as their principal tenant a variety or discount department store.
- Regional centers provide an extensive variety of goods - broad selection of general merchandise, apparel, and home furnishing, as well as services and convenience items. At least one or two major department stores are the principal tenants of these shopping centers, which typically draw customers from a large trade area.

Most town centers in the MAPC region would be classified as community centers. Typically an older downtown contains all kinds of stores but, more often than not, it is oriented toward providing convenience goods.

Large regional shopping malls draw a substantial number of shoppers from downtown trade areas. The size of these malls enables them to offer a range of goods and services at various prices. Because the consumer has more choices than in a smaller downtown, shoppers justify longer travel times to malls where many purchases can be made in a single trip. Malls usually are near housing or industrial developments and are able to capture significant portions of new trade area sales.

* Definitions from Dollars and Cents of Shopping Centers, Urban Land Institute (1979.)

Neighborhood shopping centers are also prevalent in this region but because they serve only their immediate area, they are not as threatening to town centers as regional malls. The location and size of neighborhood malls is important to note, however, as they do capture some share of expenditures in your trade area.

Since a significant number of consumers will always shop elsewhere, even the most successful retail districts cannot expect to capture 100 percent of their trade-area sales. To measure current capture in a town center and to identify growth potential, it is important to know who your competition is. There are two ways to measure competition -- through a geographic survey and a shoppers survey. All major shopping centers, neighborhood centers, and other community centers in both the convenience and comparison trade areas should be located on a map. In addition, the approximate size and type of stores in these centers should be identified.

To begin, develop a list of all commercial districts in both trade areas by community. Published sources of this information include:

- Shopping Center Directory: The East, National Research Bureau, Incorporated, Joseph F. Roberts Jr., Publisher;
- Boston Globe Atlas of Planned Shopping Centers 1976, The Boston Globe; and
- The Yellow Pages of local telephone directories.

The Shopping Center Directory and The Boston Globe Atlas contain information on stores and store size but generally list only major shopping centers. Smaller shopping malls will have to be visited to obtain store names and to estimate size. The same is true for most community and neighborhood centers. Below is a sample table showing how this data can be organized.

EXAMPLE: SELECTED DOWNTOWN WALPOLE COMPETITION

Commercial District	Location	Ft. ²	Type of Competition	Area Served
East Walpole Center	Walpole	10,000	Convenience	Neighborhood
Walpole Shopping Plaza	Walpole	55,000	Convenience	Community
Heartland Food and Drug	Walpole	60,000	Convenience/ Comparison	Community
Walpole Mall	Walpole	300,000	Convenience/ Comparison	Community/Region
Norwood Plaza	Norwood	80,000	Convenience/ Comparison	Community/Region
Norwood Shopping Center	Norwood	80,000	Convenience/ Comparison	Community/Region
Dean Street Shopping Center	Norwood	85,000	Convenience/ Comparison	Community/Region
Medfield Shops	Medfield	65,000	Convenience/ Comparison	Community/Region
Foxboro Shopping Center	Foxborough	100,000	Convenience/ Comparison	Community/Region
K-Mart Plaza	Sharon	60,000	Convenience/ Comparison	Community/Region

SOURCE: Directory of Shopping Centers in the United States (The East), the National Research Bureau, Inc., Burlington, Iowa (1979).

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A detailed description of how to write and administer a shoppers survey is found in the Business and Shoppers section. Questions on competition is one important element of that survey. Results can show which competing commercial districts pose the most serious threat to your town center. Often shopping malls which are outside your trade areas will show up as major competitors. Those within your trade area are more important to your analysis, however, as they limit what your downtown can expect to capture in retail sales. Revitalization efforts should focus on things a town center can offer that nearby malls do not; understanding your competition is crucial.

With results of both a geographic and shoppers survey, the existing competition in your trade areas can be carefully analyzed. Look for weaknesses in the competition, for goods or services which are not currently available, and be realistic about how you can best compete. Shoppers survey results may show a large demand for a clothing store in your downtown but if your analysis of the competition shows an over-abundance of such stores within your trade area, an additional clothing store may not be a realistic choice for your downtown. As we shall see in the current market conditions Section, the dollars available for consumer goods within your trade area are finite. Your survey of competition will be valuable in helping to estimate just how many of those dollars are already being spent outside your town center. ■

Retail mix, which refers to the number and types of businesses that make up a commercial district, is an important consideration when examining any trade area. Much of the success of shopping malls can be attributed to their offering a complementary mix of goods and services. Such a mix not only enables and encourages "one-stop shopping" but also attracts customers from a large trade area. Local business districts that contain a variety of goods and services also attract a more diverse, and thus larger group of patrons from their trade areas.

To analyze retail mix in a town center, an inventory of all commercial space, including offices, must be taken. As discussed in the Business and Shopper Survey section, this inventory can be part of a business survey. Because survey response is rarely above 80 percent, some estimates of business space have to be done through site visits. Vacant space usually has to be inventoried in the same way. Although a gross estimate of space is all that is needed, square footage reported by businesses should be checked by visiting each store or by using building measurements available through the town assessors office. (Because records are often filed by property owners or building address, not by individual store names, checking assessors records can be time-consuming. Site visits usually are better.)

When the size of each business in the project area is known, information should be organized by major commercial category as shown in the table on the next page.

Once organized, a careful analysis of the statistics is undertaken. Here are some of the things to look for when analyzing your information.

- The more balanced the ratio between goods and services, the better the retail mix. It is typical in older town centers, however, to find a greater percentage of space occupied by services. In the example, there is a fairly uneven mix of goods (31 percent of space) and services (50 percent).

- . Within the sub-categories of Retail Goods and Services there also should be an even distribution of space. The table that shows that while there is not much total retail space, it is occupied by a variety of stores. In the services category, on the other hand, the percentage of space by major grouping varies widely. Among groups which generate little retail activity -- Professional Services, Other Services, and Automotive -- there are large concentrations of space. Services closely linked with retail activity -- the Eating and Drinking and Personal Services groups -- are under-represented. Such statistics show weaknesses in the commercial district.
- . Vacant space is an obvious sign of a faltering commercial center. First-floor vacancies are especially critical because they are so visible. While the 4.3 percent vacancy rate in the example above does not seem enormous, it counts only first-floor vacancies and actually represents 14 percent of total storefront space. It is, therefore, a sign of an economically-troubled commercial area.
- . Too many of any one kind of service or retail establishment is not good. The exception to this, of course, is the specialty shopping area. A downtown may specialize in or be a center of trade for a particular commodity. Such a concentration creates a strong customer draw to the downtown that other types of businesses can take advantage of.
- . Certain types of businesses have large space requirements and can skew results. For example, a combination bowling alley and conference center or a building supplier with a large warehouse will add lots of square feet to their respective categories. This does not mean, however, that there is an overabundance of stores in that category. When interpreting statistics, use common sense.

EXAMPLE: INVENTORY OF COMMERCIAL SPACE

Commercial Category	Downtown Woburn	
	Sq. Ft.	%
RETAIL GOODS		
Apparel/Accessories	8,600	2.6%
Food/Liquor	12,600	3.8%
Hardware/Building Supplies	31,300	9.6%
Furniture/Appliances	12,300	3.8%
General Merchandise ¹	15,000	4.6%
Miscellaneous Retail ²	20,600	6.3%
SUBTOTAL	100,400	30.7%
SERVICES		
Automotive	32,400	10.0%
Eating and Drinking	18,800	5.7%
Personal Services ³	9,600	2.9%
Professional Services ⁴	80,200	24.5%
Other Services ⁵	71,750	21.9%
SUBTOTAL	212,750	65.0%
VACANT SPACE ⁶	14,200	4.3%
TOTAL	327,350	100.0%

1. "General Merchandise" includes retail stores that sell a number of lines of merchandise such as dry goods, apparel, furniture, hardware, and food. Department stores are included.
2. "Miscellaneous Retail" includes retail establishments not elsewhere classified, such as drugs, sporting goods, book and stationery stores, florists, and jewelers.
3. "Personal Services" includes establishments engaged in providing services for a person or his apparel, such as beauty and barber shops, dry cleaning, and laundries.
4. "Professional Services" includes establishments providing services to businesses or individuals on a fee or contract basis, such as doctors, lawyers, and finance and insurance brokers.
5. "Other Services" includes repair shops, social-service agencies, recreational facilities, and travel agencies.
6. This number includes only first-floor space in established retail buildings.

There are other problems of retail mix that do not show up in a purely statistical analysis.

- . It is important that a town center have an anchor establishment(s). Anchor establishments are stores which draw a large group of patrons to a town center on a regular basis. Customers coming to an anchor store usually shop in other nearby stores as well. While an anchor establishment can be any type of store or service, they are typically convenience stores like supermarkets or pharmacies in small-town centers. Occasionally, an older downtown will have a department store as an anchor. A centrally located anchor is best as it creates spill-over for many other retailers.
- . The quality of goods and services offered is as crucial as their variety. A town center with a statistically balanced retail mix can be a commercial failure if quality and value are not there.
- . As discussed in detail in subsequent sections, attractive storefronts, window displays and signs, accessible parking, and good pedestrian ways greatly effect how a downtown functions. A center with a wide variety of goods and services can fail if unattractive storefronts, poorly located parking lots, and hazardous sidewalks and crosswalks discourage shopping.

Through a careful review of commercial space ratios and a qualitative look at that space, ways to improve your retail mix can be identified. This is an important step toward long-range planning for your town center. As retail space becomes vacant, efforts should be made to include the kinds of goods and services that would add diversity to the commercial area and attract new customers. ■

Current Market Conditions

The success of a retail center depends on its ability to capture a share of the yearly expenditures made by the population in its trade-area. Previous sections have focused on ways in which demographics, geography, location, and retail mix effect a downtown's ability to attract customers, that is, to capture a certain market share. In this section, our discussion turns from these general characteristics of market capture to a more economic examination of current market conditions in a town center.

A comprehensive analysis of trade-area statistics for a downtown makes it possible to define both qualitative and quantitative characteristics of trade-area expenditures including:

- . Total trade-area expenditures for convenience and comparison goods,
- . Local business sales by retail category, and
- . The percentage of total trade-area dollars captured by each retail category or capture rates.

TOTAL TRADE-AREA EXPENDITURES

Total trade-area expenditures represents the total dollars spent on goods and services by a given trade-area population in a year. In this discussion, goods and services includes 10 specific categories of businesses as defined in the US Census of Retail Trade and the US Census of Selected Services. These categories are: Apparel and Accessories, Drugs, Hardware and Building Supplies, Furniture and Appliances, Eating and Drinking, Food, Liquor, Personal Services, General Merchandise, and Miscellaneous Retail. Census definitions are listed in the Appendix.

To find total trade-area expenditures, first determine which trade-area, convenience or comparison, each retail category belongs in. Drugs, Food, Liquor, and Personal Services almost always are considered convenience goods. Apparel and Accessories, Furniture and Appliances, and General Merchandise are usually considered comparison items.

Eating and Drinking, Hardware and Building Supplies, and Miscellaneous Retail can be either convenience or comparison. To determine which trade area a category belongs in, look at the retailers in that category and see if they function mostly as convenience or comparison stores. A sub-shop, small hardware store that does not carry building supplies, or a news store would all be considered convenience, that is, serving mostly the nearby population. On the other hand, a gourmet restaurant, large building supply store, or major sporting goods store, probably draw customers from the larger, comparison trade area. If a category contains mostly convenience stores, consider it a convenience goods category. If it has mostly comparison stores, label it comparison.

Once categories have been labelled comparison or convenience, refer back to trade-area characteristics to find Total Trade-Area Income for the current and projected year. The example on pages 51-52 shows:

	<u>1980 Income</u>	<u>1985 Income</u>
Total Convenience Trade-Area	\$159,254,800	\$175,831,500
Total Comparison Trade-Area	\$925,203,700	\$1,058,000,100

With these totals, total expenditures for each retail category can be estimated in the following way:

1. Expenditures on goods within each retail category as a percentage of total income is found by using Census data. (See Appendix .) Below is a list of Expenditures as a Percent of Per-Capita Income derived from 1977 Boston-Standard-Metropolitan-Statistical-Area (SMSA) census data.

<u>Retail Category</u>	<u>Expenditures as % of Per-Capita Income</u>
Apparel/Accessories	1.9%
Furniture/Appliances	2.3%
Hardware/Building Supply	1.9%
Miscellaneous Retail	3.0%

(continued)

<u>Retail Category</u>	<u>Expenditures as % of Per-Capita Income</u>
------------------------	---

Food	12.1%
Drugs	1.8%
Liquors	1.9%
General Merchandise	7.7%
Personal Services	1.5%
Eating/Drinking	5.9%

2. Multiply these percentages by Total Trade-Area Income to find Total Expenditures by Retail Type. When a retail category is convenience, multiply by the Total Convenience Trade-Area Income. For comparison categories, multiply by Total Comparison Trade-Area Income. The combined results equal Total Trade-Area Expenditures, that is, the estimated dollars actually spent on retail goods within both trade-areas in a year.
3. Do Step 2 for both the current and projected year. (Expenditures as a percentage of total income (Step 1) remain constant.)

An example follows.

EXAMPLE

1980 Trade-Area Expenditures

Retail Category	Total Convenience Trade-Area Income (1980)	Total Comparison Trade-Area Income (1980)	Expenditures as % of Boston SMSA Income	TOTAL TRADE-AREA EXPENDITURES* (1980)
Drugs	\$ 159,254,800	-	1.8%	\$ 2,867,000
Eating/Drinking	\$ 159,254,800	-	5.9%	\$ 9,390,000
Food/Liquor	\$ 159,254,800	-	14.0%	\$ 22,296,000
Personal Services	\$ 159,254,800	-	1.5%	\$ 2,389,000
Miscellaneous Retail	\$ 159,254,800	-	3.0%	\$ 4,778,000
Hardware/Building Supplies	\$ 159,254,800	-	1.9%	\$ 3,026,000
Furniture/ Appliances	\$ 159,254,800	-	2.3%	\$ 3,663,000
General Merchandise	\$ 159,254,800	-	7.7%	\$ 12,262,000
Apparel/ Accessories	\$ -	\$ 925,203,700	1.9%	\$ 17,579,000
TOTAL				\$ 78,250,000

NOTE:

- * Figures in this column have been rounded.
- All figures in constant dollars.
- Furniture/Appliances and General Merchandise usually are considered Comparison goods. In this example they were not.

1985 TRADE-AREA EXPENDITURES

<u>Retail Category</u>	<u>Total Convenience Trade-Area Income (1985)</u>	<u>Total Comparison Trade-Area Income (1985)</u>	<u>Expenditures as % of Boston SMSA Income</u>	<u>TOTAL TRADE-ARE EXPENDITURES* (1985)</u>
Drugs	\$ 175,831,500	-	1.8%	\$ 3,165,000
Eating/Drinking	\$ 175,831,500	-	5.9%	\$ 10,374,000
Food/Liquor	\$ 175,831,500	-	14.0%	\$ 24,616,000
Personal Services	\$ 175,831,500	-	1.5%	\$ 2,637,000
Miscellaneous Retail	\$ 175,831,500	-	3.0%	\$ 5,275,000
Hardware/Building Supplies	\$ 175,831,500	-	1.9%	\$ 3,341,000
Furniture/ Appliances	\$ 175,831,500	-	2.3%	\$ 4,044,000
General Merchandise	\$ 175,831,500	-	7.7%	\$ 13,539,000
Apparel/ Accessories	\$ -	\$1,058,000,100	1.9%	\$ 20,102,000
TOTAL				\$ 87,093,000

Note:

- * Figures in this column have been rounded.
- All figures in constant dollars.
- Furniture/Appliances and General Merchandise usually are considered Comparison goods. In this example they were not.

LOCAL BUSINESS SALES BY RETAIL CATEGORY

Estimating downtown sales for each retail category is one of the most difficult and most important steps of a market analysis. It is difficult because accurate sales figures are rarely reported by merchants in the business survey and most have to be estimated. It is important because sales is the determining factor in calculating market capture, the measure used to decide how well your downtown is competing.

Below is a method for estimating sales.

1. To begin, list all businesses by retail group and include square feet of space for each business.
2. Then, check business-survey results for reported sales. Add reported sales to your list in terms of sales-per-square foot.
3. Next, refer to Dollars and Cents of Shopping Centers, a guide published by the Urban Land Institute for estimates on sales-per-square foot for each kind of retailer. Add these estimates to your list.
4. Make a final estimate based on reported sales, standard estimates and your own judgement. Here are some things to consider:
 - . Demographic factors, like population growth and per-capita income, should be weighed in making judgements about sales volumes.
 - . Geographic factors. If your downtown is isolated, cut-off from much of its competition, sales may be unusually high in certain categories and your final sales estimate may be above average. Conversely, if your downtown is easily accessible and patrons have a wide variety of shops to choose from within your trade area, sales per-square-foot may be below the norm.

- Political factors. An obvious example of this is the effect of "dry towns" on liquor sales. If your community allows package stores but is surrounded by those that don't, you will probably find liquor sales in your community unusually high.
- Market factors. A store may be the only one of its kind in the trade-area and thus doing an abnormally high level of sales. Look at the information you have collected on competition and use it as a check when estimating sales.
- Business factors. Number of employees, number of cash registers, number of seats, hours and days of operation, reported sales trends, storefronts, changes being considered by store owner, window displays, store layout and fixtures -- all provide clues to sales levels. Use these as indicators when estimating sales.
- Other factors. Other factors unique to your town center can make sales levels for certain retailers unusually high or low. Consider them when making estimates.

Below is a sample of the kind of table you now should have for each retail category. Remember, this information is considered confidential and should never be included as part of a public presentation or publication.

EXAMPLE:

EATING AND DRINKING
CONVENIENCE TRADE AREA

<u>Business</u>	<u>FT.²</u>	<u>Reported Sales/FT.²</u>	<u>Published Est. Sales/FT.²</u>	<u>Final Est. Sales/FT.²</u>
Pete's Sandwiches	2,200	-	\$ 100	\$ 45
Mary's Bakery	1,700	-	\$ 67	\$ 60
Kailua Rest./Lounge	2,700	\$ 75	\$ 100	\$ 70
Coffee and Muffins	2,200	-	\$ 100	\$ 100

(continued)

<u>Business</u>	<u>FT.²</u>	<u>Reported Sales/FT.²</u>	<u>Published Est. Sales/FT.²</u>	<u>Final Est. Sales/FT.²</u>
Arnie's				
Submarines	600	-	\$ 100	\$ 80
Alice's Place	3,000	-	\$ 124	\$ 70
Pizza World	1,000	-	\$ 100	\$ 45
L & M				
Restaurant	1,400	50	\$ 124	\$ 55
A.M. Coffee				
Shop	1,400	-	\$ 100	\$ 70
The Local				
Pub	2,000	-	\$ 100	\$ 80
TOTAL	18,200	-	\$ 65	\$ 70 (Average)

CAPTURE RATES

Downtown sales as a percentage of trade-area expenditures mathematically defines the concept of market capture. In order to determine how well the downtown is taking advantage of existing market opportunities and to identify where the potentials for increased or decreased capture lie, trade-area expenditures within the downtown must be carefully reviewed.

CALCULATING CAPTURE RATES

1. To find total downtown sales for each retail category, multiply total square feet of business space in each category by the average of the final sales per-square-foot estimates. Using the example above Eating and Drinking establishments would have total sales of \$1,274,000 (\$70 x 18,200 square ft.)
2. While using an average sales per-square-foot figure is often satisfactory, you may need to refine your estimate. For example, if sales for one or two stores are well-above the average, you may want to

calculate their total sales separately. The same is true for stores with sales far below the average. In categories like Miscellaneous retail where there are many types of stores, some trading within the convenience trade-area and some within the comparison trade-area, you may have to use different average sales-per-square-foot figures to arrive at a realistic total for sales in that category. An example of using more than one sales per-square-foot estimate in finding total sales follows.

EXAMPLE

APPAREL AND ACCESSORIES
COMPARISON TRADE AREA

<u>BUSINESS</u>	<u>FT. ²</u>	<u>FINAL EST. SALES/FT. ²</u>
Oman's Family Shoe	1800	\$ 60
Costello's	700	\$ 80
Murtagh's Dept. Store	6000	\$ 100
Robbin's Country Casuals	2000	\$ 70
Siegenthaler's	5000	\$ 85
Baker's Tot Shop	1000	\$ 50
TOTAL	16,500	\$ 85 (Average)

In this example, Murtagh's is a major department store occupying 6,000 square feet of space (over 1/3 of all space in this category) with sales per square foot of \$100, \$15 above the average. So that Murtagh's business is adequately reflected in final results, it is taken out and its total sales calculated separately.

	<u>Sq.Ft.</u>	<u>Sales/Sq.Ft.</u>	
Murtagh's Dept. Store	6,000	x \$100	= \$ 600,000
All others	10,500	x \$ 85	= \$ 892,500
TOTAL SALES			\$ 1,492,500

Had Murtagh's not been calculated separately a lower total-sales estimate would have resulted.

3. There is another step which sometimes has to be taken to refine total sales figures. When a store(s) in any retail category draws customers from outside the defined trade-area, those outside sales must be calculated out of your total sales figure. Because market capture measures only trade-area dollars spent in the downtown, dollars spent by customers from outside that trade-area skew results.

Calculating out sales from non-trade-area customers is known as adjusting for inflow. The method for doing this is simple. Estimate what percentage of sales is derived from persons outside the trade area (inflow). Business- and shopper-survey results are often helpful in estimating this. Subtract that percentage of sales from total sales to get a more accurate sales estimate.

In the example below, many personal-service establishments are attracting customers from outside their convenience trade area. Sales figures for these retailers therefore are adjusted for inflow.

PERSONAL SERVICE
CONVENIENCE TRADE AREA

<u>Business</u>	<u>Ft.²</u>	<u>Final Est. Sales/Ft.²</u>	<u>Sub- Total</u>	<u>Inflow</u>	<u>Total Sales</u>
All Barber Shops	1500	\$ 35	\$ 52,500	0%	\$ 52,500
Beauty Shops	5100	50	255,000	15%	216,750
Fred's Hairstylist	2000	80	160,000	15%	136,000
Laundry	3600	30	108,000	5%	102,600
Decorator	2200	60	132,000	10%	118,800
Bowling Alley	6000	5	30,000	5%	28,500
All Others	1000	40	40,000	10%	39,600
TOTAL					\$ 695,000

4. Once total sales for each retail category have been estimated, it is possible to determine capture rates. As stated, market capture is downtown sales as a percentage of trade-area expenditures. Finding total-trade expenditures for each retail category was explained previously in this section. To determine market capture for each retail category and for the downtown as a whole simply find total sales (by category or downtown) as a percentage of total expenditures (by convenience or comparison trade-area, or combined trade-area for downtown capture). Referring back to the example of trade-area expenditures (1980 Trade-Area Expenditures) and to the example on total Apparel/Accessories Sales, we can find market capture for the Appares/Accessories category.

Example

Downtown Sales	\$1,492,500	
		= 8.5% Market Capture
Trade-Area Expenditures	\$22,527,000	

5. The table below is an example of capture rates for seven major retail categories and for a downtown. Note that Furniture and Appliances, and Hardware and Building Supplies are not listed as separate categories. Because there were less than three stores in each of these categories results have been combined under Miscellaneous Retail. To insure the confidentiality of sales information, combine one-of-a-kind stores, or categories with only a few stores, into a more general grouping. The Miscellaneous Retail group is usually the most logical place. However, other groupings are possible like Liquor being grouped under Food, or Appliances under Hardware/Building Supplies.

EXAMPLE

1980 CAPTURE RATES

COMMERCIAL CATEGORY	TRADE AREA EXPENDITURES ¹ .	DOWNTOWN SALES	PERCENT OF TRADE AREA EXPENDITURES
Drugs	\$ 2,867,000	\$ 650,000	22.7%
Eating/Drinking	9,390,000	1,274,000	13.6%
Food/Liquor	22,296,000	3,394,000	15.2%
Personal Services	2,389,000	754,000	31.6%
Apparel	17,579,000	1,492,500	8.5%
General Merchandise	12,262,000	-0-	-0-
Miscellaneous	11,467,000	960,800	8.4%
TOTALS	\$ 78,250,000	\$ 8,525,300	11.0%

1. Figures in this column are based on Convenience Trade Area Expenditures except Apparel which has been calculated on Comparison Trade Area Expenditures.

SOURCE: Metropolitan Area Planning Council, Boston, MA (1980).

NOTE: All figures in constant dollars.

INTERPRETING CAPTURE RATES

Every trade-area has certain demographic and geographic characteristics and each town center contains its own unique number and variety of stores. Because capture rates are relative to factors like these, there really are no "average" capture rates for retail categories or for downtowns.

To interpret capture rates for your town center, that is, to determine how well your center is competing, you must make judgements based on factors unique to your trade-area.

- . Comparisons to similar town centers where market analysis data is available, is helpful in evaluating capture rates, and can serve as a guide. A consultant with extensive experience in analyzing market captures also can be invaluable as his experience provides a wealth of comparative data.
- . Look at trade-area characteristics. Growing population and income levels can mean booming sales or high capture rates. Declining population may explain why capture rates seem low.
- . Carefully review conclusions drawn about retail mix in your town center. Note retail types which are missing and relate that information to capture rates. If there are few stores in a category, then capture may be low. Conversely, a large concentration of stores may result in an unusually high rate for that category. Examine the mix within each retail category as well. Are there too many of one kind of store? This can make capture rates low. Look for diversity of goods and services if capture rates seem high.
- . Review sales per-square-foot data. Is the average sales per-square-foot in a retail category above or below published standards? Are certain retailers doing unusually well or are some barely making it? High capture rates result from high sales per-square-foot, average rates from average sales, and low rates from a lack of sales.

- Review the information collected on competition. Does it make sense that capture rates downtown are high even though competition is stiff? Look for reasons why retailers in your town center may or may not be competing successfully against their competition.
- Look at business and shopper survey results. What weaknesses do they show in your town center. Results often explain why capture rates are unusually high or low.
- Keep national marketing trends in mind when evaluating captures. A capture rate for general merchandise may seem low but remember the national trend toward mass merchandising and discount merchandising is geared toward large one-story commercial structures surrounded by a sea of parking. Most town centers cannot physically accommodate these stores. Don't be surprised by low numbers for captures in categories like this. Look for other ways to market your downtown.

Examine captures rates for each retail category, then for the downtown as whole, using the guidelines above. List findings for each category and use these to draw conclusions about possible growth areas. Below is an example of how this information can be organized.

EXAMPLE

APPAREL/ACCESSORIES
COMPARISON TRADE AREA

<u>1980</u> <u>TRADE AREA SALES</u>	<u>1980</u> <u>CENTER SALES</u>	<u>1980</u> <u>CAPTURE</u>
\$17,579,000	\$1,492,500	8.5%

Evaluation:

- Based on the number and size of stores and comparative data available, the typically expected capture in this category for the comparison trade-area would be between five-10 percent. 8.5 percent represents an average capture.

- In terms of population and income, the trade-area is growing slightly and projected to continue to grow. Housing starts have shown gains and unemployment is low.
- Retail mix for the town center is fairly even. Within this category, the mix is very good. Both quality and variety of goods are available.
- Individually, most retailers in this category have average or above-average sales. Long-established clientele, personal service, and good merchandising explain these high sales levels.
- An 8.5 percent capture is extremely good considering the strength of nearby competition. Large discount apparel stores outside of the town center capture the lion's share of trade-area expenditures in this category.
- Shoppers listed a ladies, and men's discount clothing store most often as the type of store they would like to see added to the town center. Businesses in this category reported sales up over a three-year period.
- Most new discount clothing stores now locate in shopping malls or along major highways, not in older town centers. However, there is a growing trend to open small discount shops (under 2000 square feet) in town centers.

Conclusions:

An 8.5 percent capture is within the typically expected range. Given a growing trade-area, a currently strong group of existing apparel stores, and high shopper demand for an additional clothing store, moderate expansion in this category seems possible. A capture closer to 10 percent may be achievable. Given strong and growing competition from nearby malls, however, the expansion of existing stores or the addition of a small, independent shop catering to teens (a significant portion of existing customers who appear to be underserved) may be the best way to increase capture.■

Market Potentials

Having examined existing conditions, market potentials must now be explored. Begin by summarizing the main findings of your analysis thus far; they will be the basis for future projections.

Next, consider three scenarios as future (five years from the current year) possibilities -- growth, decline, and status quo.

STATUS-QUO

If market conditions are not expected to change dramatically within five years, then the downtown's overall capture rate will probably remain constant. Depending on current conditions, this may or may not be acceptable. If current capture is low, then the status quo will probably be as unsatisfactory five years from now as it is today. If current capture is average, then maintaining that level will indicate a stable market but not a growing one. If current capture is high, the downtown is probably already an aggressive competitor and maintaining that level would mean continued success.

To measure the impact of constant capture on a downtown, estimate the change by referring back to "Projected Year Trade-Area Expenditures". Then multiply Total Trade-Area Expenditures (projected year) by the current overall capture rate to find Total Downtown Sales for the projected year.

EXAMPLE

$\$87,093,000 \times 11.0\% = \$9,580,230$ Total Downtown Sales (projected year)

If your trade area is growing, then expenditures in the projected year will be slightly greater than those of the current year even though overall market capture remains the same. These additional expenditures are likely to be reflected in higher sales levels at existing stores. Additional dollars probably will not be sufficient to support new stores.

EXAMPLE

Constant Capture Projected Year	\$ 9,580,230
Current Capture	- 8,525,300

Projected Increase In Downtown Sales \$ 1,054,930

If your trade area is not growing, then expenditures in the projected year will be less than those of the current year given a constant market capture. This will mean that fewer downtown sales should be expected and that some marginal businesses may close unless downtown improvements are made to attract additional sales.

DECREASED CAPTURE

If downtown merchants begin to capture fewer and fewer trade-area expenditures, then the downtown's overall market capture will fall. Estimating a decrease in market capture usually requires making certain assumptions. Of course, if it is known that a major business or employer will be leaving the downtown area or that a significant portion of your commercial center will be demolished as part of new highway construction, then you can base decreased capture estimates on the actual number of people (trade-area expenditures) or retail space, which will be lost.

In many cases, however, less tangible factors might lead you to assume that sales levels will decrease. For example, the revitalization committee may find that parking or traffic problems keep many people away from the downtown. Even other less-specific problems like the run-down appearance of stores, poor merchandising techniques, vandalism, or fear of the local teenage gang on the corner, may be leading to commercial decline. Whatever the problems, if they are serious and not corrected, then you can assume market capture in the downtown will decrease over time.

When making assumptions about possible market decline remember to consider your trade-area population and income projections. It is important to determine the degree to which downtown problems may be off-set by projected gains or worsened by projected losses.

To estimate decreased capture, refer back to the current sales levels of downtown retailers and capture rates for each retail category. (See discussion under current market conditions.)

- . Identify those retailers with sales levels well below the average in their category. Assume that with decreasing business downtown, these are most likely to close. Calculate their sales out of their category total.
- . Next, look at retailers with extremely high sales levels and question whether these would remain high if general conditions downtown worsen. Calculate their sales at more average levels and subtract the difference from the total for their categories.
- . Then review each retail category and pin-point those most likely to be effected by problems in your downtown. For example, if a particular downtown block has several vacancies and much vandalism, how long can you expect the remaining stores to operate there.
Or if you know a large office employer will be moving out of the downtown, determine how this might effect the eating and drinking businesses downtown. Estimate how far you think average sales per-square-foot for those categories may fall and calculate decreases accordingly.
- . Other regional or national trends may be affecting your town center. Identify the businesses most likely to be hurt by these. For example, a large supermarket chain may be closing in New England resulting in the loss of your downtown's only supermarket. Or a major manufacturer may be moving to the sun-belt leaving your downtown with a vacant building and without many lunch-time shoppers. Use techniques described above, where appropriate, to calculate any decrease.
- . Review your business surveys to see if any businesses will move if adequate space for expansion is not available downtown. Which business reported decreasing sales? Can you assume they will remain open if downtown conditions are not improved? Calculate decreases accordingly.

The example below shows how decreases were calculated for the Eating and Drinking category in one study.

EXAMPLE

EATING/DRINKING

Business	Ft. ²	<u>Current Conditions</u>		<u>Projected Conditions</u>	
		<u>Sales/Ft.²</u>	<u>Sales</u>	<u>Sales/Ft.²</u>	<u>Sales</u>
Pete's					
Submarines	2,200	\$ 45	-	-0-	-0-
Mary's					
Bakery	1,700	60	-	68	\$ 115,600
Kailua Rest./					
Lounge	2,700	70	-	68	183,600
Coffee and					
Muffins	2,200	100	-	70	154,000
Arnie's					
Submarines	600	80	-	68	40,800
Alice's					
Restaurant	3,000	70	-	68	204,000
Pizza					
Universe	1,000	45	-	-0-	-0-
L & M					
Restaurant	1,400	55	-	68	95,200
A.M. Coffee					
Shop	1,400	70	-	68	95,200
The Local					
Pub	2,000	80	-	70	140,000
TOTAL	18,200	\$ 70 (Aver.)	\$1,274,000	-	\$1,028,400

	<u>Current Conditions</u>	<u>Projected Conditions</u>
Trade-Area Expenditures	\$ 9,390,000	\$ 10,374,000
Downtown Sales	\$ 1,274,000	\$ 1,028,400
Capture Rate	13.6%	9.9%

EXPLANATION

1. Current Downtown Sales; \$1,274,000, was found by multiplying total square feet by average sales per square foot or 18,000 Ft.² x \$70.

2. Projected Downtown Sales were based on the following assumptions:

- . With decreasing business downtown, Pete's Sandwiches, a currently marginal business, will close. Future sales therefore equal zero.
- . If downtown conditions worsen, Coffee and Muffins, Arnie's Submarines and the Local Pub will not continue to do an above average business. Calculate their sales at the current average, i.e. \$70/Ft.².
- . Pizza Universe is now located in a run-down area. If conditions there worsen and vandalism increases, it will move out of the downtown. Future sales therefore are projected at zero.
- . The Cohen Shoe Factory is moving out of the downtown and its employees generate a substantial portion of the downtown's luncheon business. Therefore, future sales for Eating and Drinking Establishments, other than those mentioned above, are calculated at a lower average than the current average.

After calculating anticipated decreases for the future, add the totals for each retail category. Take this total as a percentage of Total Projected Trade-Area Expenditures to find the projected decrease rate. A decrease of more than one percent in overall market capture is considered extreme and unlikely given the absence of catastrophic changes. If your estimate is larger than one percent, recheck your assumptions.

INCREASED CAPTURE

If downtown merchants begin to capture more trade-area expenditures, then the downtown's overall market capture will increase. Like estimating decreased capture, the increased-capture scenario requires that certain assumptions be made. Again, if it is known that a major office building or retailer will be opening downtown or that a local manufacturer is planning a large expansion, then increased capture estimates can be based on the number of people (trade-area expenditures) or square-feet of retail space, which will be gained.

When there are not such clear reasons for optimistic projections, other factors may indicate that future increases in downtown sales are likely. If trade-area population, income, and employment are growing, then more dollars will be available to be spent downtown. These factors are usually the most important indicators of growth potential. They should be carefully examined to determine what type of people are living and working in your trade area. For example, it is useful to determine what segments of the trade-area population are growing -- teenagers, young adults, the elderly, etc. - as different groups have different consumer demands. The elderly are often less mobile than younger groups, tend to shop close to home, and buy mostly convenience goods. Young adults, on the other hand, typically are setting-up households and raising children. They tend to buy a much wider range of goods including more comparison items like clothing, furniture, and appliances.

Planned downtown improvements are also important to look for when projecting growth. An upgraded or additional parking lot, a new traffic pattern, new pedestrian ways, landscaping, or storefront improvements can all add to increased commercial activity downtown. An active merchants group is also an indication that businesses are aware of the need to continually improve merchandising techniques and selection in order to remain competitive.

To project increased capture, match growth indicators to retail categories most likely to be effected. For example, if an elderly housing complex is being constructed downtown, use the projected number of tenants and their expected average income to find potential increase in trade-area expenditures. Refer back to the percentage of income spent on retail types and determine what portion of these additional dollars are likely to be spent downtown in retail groups like food or drugs. Project increased market capture in these categories accordingly.

EXAMPLE

An elderly housing complex of 45 units is under construction. It will house an average of 1.15 persons-per-unit or approximately 52 persons. The average income of residents is \$4,200.

It is assumed that these people do not live in the downtown area now and that given their new location, they will do most of their shopping downtown in the future.

Therefore, this group represents an additional \$218,400 in trade-area income. (\$4,200 per-capita income x 52 persons = \$218,400 Total Income)

Using the percentages listed in a previous table to calculate expenditures by retail type, this group represents a potential increase in downtown sales of \$87,360.

<u>Retail Category</u>	<u>% of Trade-Area Expenditure</u>	<u>Additional Total Income</u>	<u>Downtown Sales</u>
Apparel/Accessories	1.9%	\$ 218,400	\$ 4,150
Furniture	2.3%	"	\$ 5,023
Hardware	1.9%	"	\$ 4,150
Miscellaneous Retail	3.0%	"	\$ 6,552
Food	12.1%	"	\$ 26,426
Drugs	1.8%	"	\$ 3,931
Liquor	1.9%	"	\$ 4,150
General Merchandise	7.7%	"	\$ 16,817
Personal Services	1.5%	"	\$ 3,275
Eating/Drinking	5.9%	"	\$ 12,886
TOTAL			\$ 87,360

If merchants begin to market their goods more aggressively, then average sales per-square foot should increase. Choose which retail categories you think are likely to do better in the future and compute sales in those categories at a higher sales per-square foot figure.

Even though you are projecting increased capture in this scenario, there may be some businesses which will not do well no matter what improvements are made. Be sure to decrease or subtract-out sales in businesses which are expected to do poorly or fail in the future.

As explained under Decreased Capture, once all projections have been made based on future assumptions, add sales in each retail category to find total sales and overall market capture. An increase of more than one percent in the overall capture rate is considered extreme and unlikely given the absence of catastrophic changes. If your projection is greater than one percent, recheck your figures and assumptions.

The table below shows how market potential data can be organized based on the three scenarios -- status-quo, increased, or decreased capture -- described in this section.

EXAMPLE

Projected Trade-Area Expenditures

	<u>Trade-Area Expenditures</u>	<u>Downtown Sales</u>	<u>Capture</u>
<u>Current-1980</u>	\$ 78,250,000	\$ 8,525,300	11.0%
<u>Projected-1985</u>			
Constant Capture	\$ 87,093,000	\$ 9,476,000	10.2%
Decreased Capture	\$ 87,093,000	\$ 8,931,600	10.2%
Increased Capture	\$ 87,093,000	\$ 9,952,400	11.4%

Note: All figures in constant dollars.

CONCLUSIONS

Remember, market analysis is based on both quantitative and qualitative measures and conclusions drawn from such an analysis should be used to guide committee decisions on downtown revitalization. Unlike a traffic study which is based on more exact measures which can suggest engineering solutions to physical problems, a market analysis relates more to less-tangible factors, like socio-economic conditions, which influence the operation of a downtown. It provides opinions and ideas on the kind of improvements most worthwhile to the commercial success of a downtown.

Conclusions drawn from a market analysis often change the way a committee thinks about their downtown. For example a committee may find that the downtown is competing surprisingly well with the shopping mall down the street; or that the real economic villain is the appearance of the downtown; or that they have been ignoring what shoppers perceive as the downtown's greatest asset; or that despite strong demand, it is unlikely given market trends, that a department store will locate downtown.

A market analysis can help a committee develop economically realistic solutions to their problems. It is an important initial step in a downtown-revitalization project as it provides an economic framework within which to make other decisions on land-use, parking, traffic, and design.

LAND USE

Land-use analysis involves a detailed study of the physical characteristics and activities of a particular neighborhood, business district, or entire town. The land-use study is one of the first analyses done. All land should be inventoried by dividing it into major categories of residential, commercial, industrial, open space/recreation, and public/institutional. Mapping of this inventory reveals the location and acreage of each use. This inventory information should be combined with additional information on population, economic projections, and transportation factors, and the amount of land used for various purposes should be analyzed to give some indication of what future demand will be like.

The amount of land zoned for commercial use is often too high in many town centers, spreading businesses out along the roads and drawing business out from downtowns. The advent of the automobile, for example, has done much to change the dynamics of smaller downtowns and suburban villages. Before the automobile came there was little commercial development along routes separating town centers. But after the auto arrived, parking in the older downtowns became scarce and through-traffic was slowed down by the ingress and egress from parking spaces along main streets. In order to reduce downtown traffic, and as a response to new marketing techniques geared to the auto-driving shopper, communities began to rezone the routes between towns for commercial use. Thus, strip zoning evolved with its auto-oriented uses -- "Plenty of Free Parking" -- and what was created was a mixture of successful businesses, marginal businesses, non-conforming uses, and unimproved lots.

Space analysis for new uses should be based on current space needs and whatever legal constraints are already in place, like parking and landscaping requirements. Vacant land should be appraised for its suitability for development considering such factors as slope, drainage, public utilities, and the need for open space. The challenge, then, is to find compatible mixtures of uses suitable

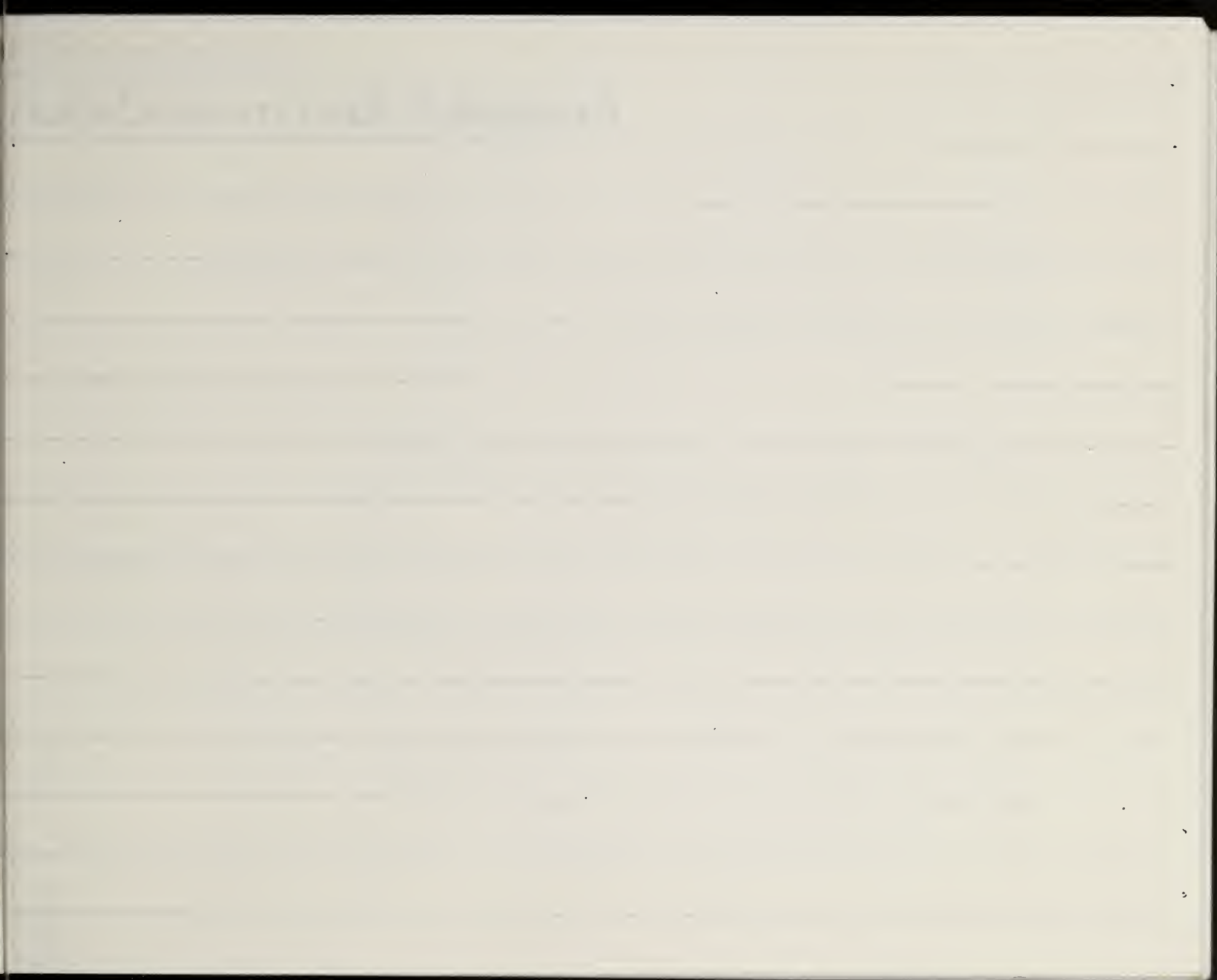
Analysis

To analyze something is to become totally familiar with it, to study its history, question it, take it apart, discover interrelationships, and learn as much about it as possible. The way a town functions, its patterns, its habits, its strong and weak points must all be analyzed in a center-revitalization project.

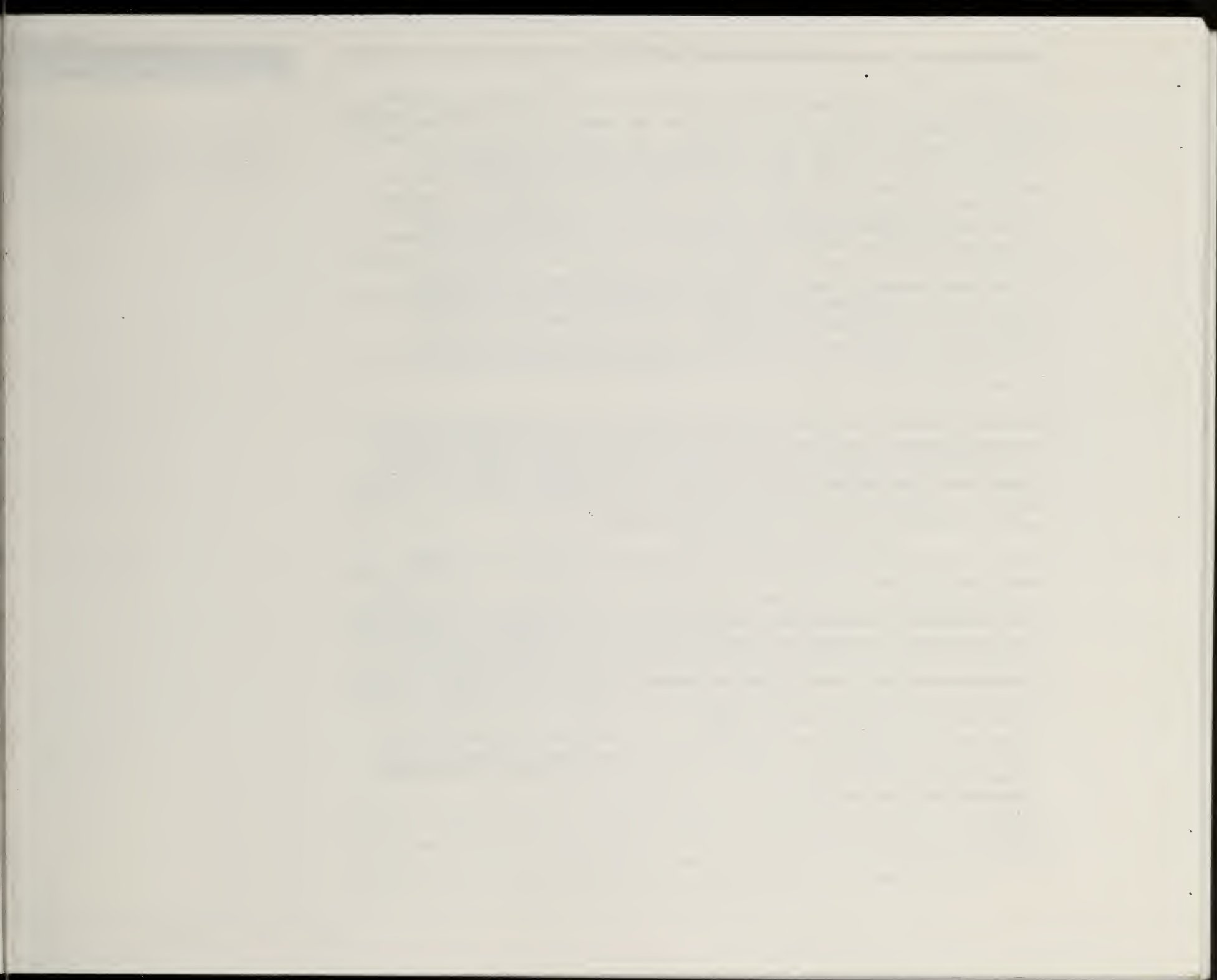
As soon as someone enters a town an impression is formed and initial analysis has begun. People, by nature, analyze what they see -- they relate it to themselves and to their surroundings. It is difficult to be objective and non-judgemental so initial analysis is usually based on personal emotions and preferences. It is the ultimate role of analysis to prove or disprove assumptions for the end result of making creative and feasible recommendations.

Before analysis begins, the committee should have defined the project boundaries, collected data for the area, listed problems and assets in order of importance, and stated project intentions or goals. The collected information and problems or assets will be analyzed with goal expectations in mind. For example, a town with a goal to encourage retail growth in its center will analyze its traffic, parking, and urban design much differently than a town with a goal to limit retail growth.

The four main categories of analysis for a center-revitalization project - land use, marketing, traffic and parking, and urban design are here summarized separately for presentation purposes only. All forms of analysis developed are dependent upon one another. For example, traffic patterns effect parking, land use, and marketing in a town center, and a change in any one of them can effect traffic. A town functions as an organic whole and a change in any facet can result in a sequence of changes in the whole.



Analysis & Recommendations



In addition to the actual business meetings of the committee, however, there are several other ways to involve the community and achieve the widest possible dissemination of ideas. The most important of these is the press. Press involvement in the project from the outset is essential. As soon as a committee is formed the relevant newspapers should be identified and contacted. In some few instances, a project may be large enough or glamorous enough to warrant interest by the electronic media. There is no project so small that the print media, at some level, will not be interested, and there is no single community in eastern Massachusetts not covered by at least one local paper. Invitations to every committee meeting should be issued and press releases prepared for important developments. As the project matures, press people that have been involved throughout its life will often be particularly helpful in disseminating results and stimulating interest in the community at large.

The most important aspect of adequate press coverage is maintaining a constant stream of information to the community. Ideally, this will stimulate anyone concerned or disturbed by something to come forward early, both improving the final product and easing its acceptance in the end. But perhaps just as importantly, it reinforces the feeling that you are operating in an open and honest manner.

There are two additional means of involving the community of some importance: surveying and public meetings. Surveying will be discussed in more detail as a technical aspect of market analysis. Public meetings encompass a broad variety of activities directed at bringing the ideas of the project before groups other than the committee. They may be general open meetings to which the public at large is invited, or they may be more directed, such as meetings with a conservation commission, board of selectmen, merchants association, or church group to explain the project and/or address some of their specific concerns. Meetings may even be with individuals. A committee will be well advised to participate in as many activities as time and energy allows since the success of the project must ultimately rest on widespread community acceptance.■

INDIRECT FUNDS

- . Professionals may offer services free or at a discounted rate where there is an advertising benefit to them.
- . Planning councils, like MAPC, offer technical-planning and design assistance to towns in need. An application process is necessary, but the effort is worthwhile if the town is chosen.
- . Nonprofessional volunteers can be utilized to help conduct surveys, count traffic, and gather other necessary information.
- . Schools may provide student assistance in exchange for experience and educational gain.

Fundraising techniques will vary according to the group being approached. For example, when seeking government, foundation, or non-profit group contributions some type of formal application process is usually required. To solicit funds from individual businesses or people, a mail campaign or a feature article in the local paper are good ways to reach your audience. Personal contacts are always best in soliciting funds from any person or group as the project can be fully explained.

Whatever the specific approaches chosen, it is good to establish the fundraising function early. It should be assigned to an individual or a small subcommittee, preferably comprised of individuals experienced in either fundraising or with the business community. Definite goals should be set, and detailed accounts maintained and reported on regularly to the committee as a whole.

COMMUNITY INVOLVEMENT

Engaging the interests and energies of the local community is central to the ultimate success of any center-revitalization project. The most important mechanism for doing this will be the committee itself. Through the broad interests represented, and the specific contacts of individual members, the project should engage every aspect of community life.

considered under public domain. Below is a list of groups which may contribute.

DIRECT FUNDS

- . Merchants Associations - A group that usually benefits most from a Center revitalization project, merchants will often contribute money or materials toward the cost of planning a project.
 - . Banks - Donations from local banks are quite common. Their donations are effective advertising means and build good relations with the public.
 - . Historical Societies - Older districts with historic buildings are of special concern to historic societies and donations are often given with the hopes of preservation.
 - . Service Organizations - Rotary clubs, Lions clubs, Garden clubs, and other civic-minded organizations are good candidates for contributions, both of money and of assistance.
 - . Individuals - Donations from individuals are always welcome. Sometimes someone is interested enough in the project to show his/her concern with a monetary contribution.
 - . Government - Local town governments may have planning funds. Some state and federal money is also available although all government funds for planning are becoming increasingly scarce.
 - . Foundations - Foundations or corporations located in the vicinity are sometimes willing to financially support a project.
- * Implementation costs, that is the price of actually constructing planning recommendations like a new parking lot or storefront, will be discussed in the analysis, implementation, and appendix sections of this report. For fundraising, only the costs of preparing the plan will be considered.

The Revitalization Process

CENTER REVITALIZATION MANUAL
A Guide to Improving Your Downtown

Prepared by:
Metropolitan Area Planning Council
December 1982

surveyor if they are grouped reasonably closely and do not exhibit exceptionally rapid or slow turnover. With this in mind, the locations for the survey should be selected. They should be selected to form a representative sample of town-center characteristics. Both sides of a main business block should always be included. Any important shopper parking lot should be included and any location suspected to be used primarily by commuters or employees or other long-term parkers (if this is not the intent of the location) should be surveyed.

The times and days selected for the study are also important. Based on local knowledge and/or business and shopper survey results, a day should be selected that yields the most information possible. Although it is the most heavily used days that are of greatest interest, if there is a dramatic imbalance (due to banking, etc.) the heaviest day should not be the only day surveyed. An average day is best for a single day survey, but it is sometimes valuable to supplement a single day's study with another as well. Sometimes Saturdays exhibit significantly different characteristics and should be studied. The times selected for study are similarly important. These should generally include, at least, the opening of stores by nine and extend through lunch to one o'clock. Sometimes it may be necessary to study the entire day and sometimes -- in the case of commuter-oriented facilities -- the study should begin by seven in the morning. (If the study is to extend for more than four to six hours, relief should be provided for the surveyors.)

As indicated, this study is conducted by observing the occupant of each space every quarter hour. This is generally adequate. Field sheets should be developed that key locations to a detailed map. Space should be left on the sheet to allow for illegal parking and surveyors should be instructed to indicate such locations on their maps (see Appendix for examples).

Most town centers have a very limited parking supply -- particularly in prime locations. To function properly, they must have a rapid turnover in these prime, convenience locations. Typically, a prime convenience space might turnover every 20 minutes. If this spot is occupied by a long-term parker -- an employee or a commuter, almost 24 possible uses of that location over an eight-hour working day (3 per hour x 8 hr) are eliminated.

business hours and an estimate of capacity may be made by counting existing occupants and adding an "eyeball" estimate of how many more could fit comfortably. This may be supplemented by making map measurements from the base map and applying a very liberal parking standard, say 350-500 square feet per car, to account for the ad hoc nature of the parking. Between these two techniques, a good estimate should be achievable.

The inventory is now ready for use. By itself it tells little, but combined with other studies and improvements, it provides the basis for the parking plan.

PARKING OCCUPANCY/DURATION

This is the other basic study of parking. It tells how effectively the existing parking is being used and it yields the most information for subsequent improvements. In its simplest form, the occupancy study simply counts cars in an area and divides by the number of spaces mapped for the area to obtain an occupancy rate. Although somewhat informative, this method leaves many questions unanswered and is not recommended. The recommended form of this study includes a duration element and results in a very thorough understanding of downtown parking operations. The basic technique is to survey individual parking spaces at regular time intervals to determine both occupancy rate and duration of occupation for each location (See the Appendix for forms, etc.) The design of a study of this sort calls for the exercise of considerable judgement. The basic questions to be answered are how many spaces are to be studied, which spaces, and when? The care with which these questions are answered will determine just how useful its results will be.

Generally, it is both impractical and unnecessary to study all possible parking spaces in a downtown. The number to be studied should be based on available manpower and on the degree of coverage felt to be necessary to achieve representative results. For most small towns, MAPC recommends a 15-minute interval for coverage -- that is, each individual space should be checked and its occupant identified (usually by the last three characters of its license plate) each 15 minutes. Depending on turnover, this means that each surveyor can check from 40 to 80 spaces. A good working range for planning has been found to be 50-60 spaces per

Technical Data

- Turnover, closely related to duration, measures how frequently a parking space is used. It is measured as the average number of vehicles using a space over a period of time, usually a one- or an eight-hour period. It is through turnover that a single space can service 20, or even 30 parkers in a single working day. Like duration, it should be examined by location and for illegal users.

The results of this study can identify both problems and possible solutions. Although the exact means of turning these results into actions will be discussed under "Improvements," it readily may be seen that a downtown with insufficient spaces, or spaces jammed with commuters and employees, or with one over-subscribed street and three empty parking lots has clearly identifiable issues to deal with.

CORDON COUNT

Cordon counts are used in parking studies to obtain detailed counts applicable to the total parking accumulations in the downtown. In particularly large downtowns or those with widely varied conditions, they are frequently the only effective means of understanding over-all conditions. Basically, a cordon count seals off the area of interest, establishing a "cordon" around it. Everything that crosses that cordon is noted and the results tabulated at frequent, usually 15 minute, intervals. By rating the difference between the number that went in and the number that are at an accumulation at any given time may be estimated.

A cordon count is normally conducted over a 12-hour period - from 7 AM to 7PM and uses a large number of people. Due to the long period of coverage and the need for constant attention, manpower must exceed cordon points by 25-50 percent to provide for frequent relief. Unlike some other studies which may be spread over considerable time or scaled down to fit available manpower, the downtown area must be identified and all significant routes leading into and/or out of it must be covered. To be effective all routes must be constantly covered. In addition to the running counts an opening and closing count of vehicles in the cordon are made to verify results.

A cordon count may be made with varying degrees of classification. In addition to counting all vehicles entering or leaving the cordon, pedestrians, trucks, buses, or vehicles of special interest may be separated and counted individually.

The results of this study usually are examined at each individual location and combined for all locations studied to yield an overall picture. Thus it may be found that one particular area or lot is used almost exclusively by long-term parkers while the on-street locations exhibit rapid turnover as they should, but the entire area is over-utilized. To assess this, several different measures are derived for each location:

- . Utilization is generally studied as a peak percent of spaces occupied at any one time and as a percent of total space-hours available:

$$\text{Peak accumulation} = \frac{\text{Peak number of parkers}}{\text{Total spaces in the area}}$$

Due to natural turnover and difficulty locating spaces when heavily used, a maximum of 80-85 percent of total spaces is considered saturated. Space-hour utilization is calculated by dividing the number of possible spaces times the number of intervals into the total number of occupied space intervals. Although this is normally evaluated over the entire survey period, it may be desirable to examine it for some periods of particularly heavy usage, as well, if this would differ for the day as a whole. Care should be taken not to develop a false picture of actual usage during relevant times of day by starting very early when few people are using a center. (A shopper doesn't care how many spaces are available at six in the morning, but cares very much how many are available at 10.)

- . Duration of stay is important both to identify possible users and to better design facilities. Duration should be measured separately for legal and illegal parkers (illegal both in location and overtime). Average duration is measured by dividing the number of space hours actually occupied by the total number of different vehicles using them. This identifies areas used by employers and commuters, and analyses time limits, enforcement, etc. The duration study also helps verify convenience- and comparison-shopping characteristics of an area, since most convenience trips are short (15 minutes to one hour) while most comparison trips require stays of over one hour.

they have smaller subareas. Although there is a certain amount of cross supply of parking between these areas, it is good policy to see that the supply is individually as well as collectively adequate. Even in the case of a highly unified town center the pressures of sheer distance may indicate the delineation of subareas within the community. Parking subareas should be oriented to serve real characteristics of an area -- a block of stores, an existing lot, even a commuter stop. Only experience and intimate knowledge can develop really useful parking subareas. A town center should not, however, be divided up into too many subareas -- it will give a distorted picture of supply and demand and can lead to unfortunate design choices, specifically developing many small lots rather than a few large ones. Three to six subareas is usually a good choice for analysis in most small centers. Within each parking subarea, total supply should be broken down from the inventory by on- and off-street and by public and private parking. This constitutes the supply side of the analysis.

Demand is evaluated based on existing land uses and verified through the cordon and/or duration studies. Total parking demand is estimated by applying parking standards for each land use to the amount of that land use in the subarea. Standard criteria used by MAPC have been adopted, adjusted, and refined to reflect local conditions. The standards apply to a wide variety of land-use types, and have been found to provide better estimates with less trouble to group-use categories -- such as office, for example, rather than doctors, lawyers, insurance, and real estate agencies, etc. The greater aggregation actually improves the estimate by averaging out small variations that could bias results otherwise. The standards used by MAPC along with several more broadly based averages for comparison are presented in Table A.

Whatever degree of classification is used, the results are plotted by hour or counting interval to show total vehicular accumulation in the downtown. This is compared to the 80-85 percent and 100 percent capacities to study total sufficiency. Other results usually are extracted for traffic and other purposes.

Due to the large commitment of manpower a cordon count is not usually repeated. Instead its representation of general conditions usually is evaluated through comparison to simultaneous automatic-traffic-recorder (ATR) counts and/or to published data.

OTHER SOURCES

There are numerous other sources of data on parking characteristics. Perhaps the most important of these are business and shoppers surveys. These usually provide valuable information on preferences about length of stay, actual parking preferences, origin, and parking provided by merchants. These act both to verify results obtained by other means and to identify preferences or desires. The complaints, preferences, and especially the suggestions developed through these surveys must not be ignored.

PARKING DEMAND

The goal of all parking studies is the improvement of parking conditions for the town center. In addition to studies of current conditions, it is necessary to have a firm projection of the amount and location of parking that will be necessary to satisfy future requirements. This is based on existing and potential uses and activity levels in the town center and consists of two basic parts: the analysis of existing parking supply and demand and the projection of parking demand into the future.

EXISTING DEMAND

The analysis of existing supply already exists in the form of the inventory. However, to make this fully useful it is necessary to relate that supply to specific areas of the town center. Most town centers, unless they are very small, do not function as a single, unified whole. Usually

These standards are used directly with the combined results of the land-use and business surveys to evaluate total parking demand by parking subareas. These results always should be checked against actual experience for the entire center. Based on these estimates, by subarea, a map and/or table should be prepared that shows the inventories and demands with surplus or deficiency indicated. Improvement efforts to alleviate existing problems should concentrate in areas exhibiting a deficiency.

FUTURE DEMAND

The techniques described above are adequate to deal with existing problems, but they say nothing about preparing for improved conditions in the future. The techniques for addressing this issue are closely related to those for dealing with existing conditions in that they apply standards to uses and activities. There are two major vehicles for determining the future level of activity for which parking should be planned: the land-use plan and the retail-market analysis.

The land use plan should, by now, have addressed any major new development that might take place -- its nature and location. It should also have examined any anticipated changes to public facility location or major conversions of use such as school closings, fire, or police expansions, or relocations. Any significant demolitions or new open space development also should be pretty well understood. All of this will, of course, be affected by the requirements of parking and later of traffic, but these adjustments may be made in balancing the needs of the various revitalization components. And in any case, most people familiar with a town center have a fair idea of the kinds of changes that will have to take place.

In addition to the major use issues addressed in the land use plan, most centers will want to provide for increased capacity for retail sales. This already should have been assessed as part of the retail market analysis and is expressed as both dollars and square feet of new retail space. One of the scenarios developed in the study should be selected -- usually the "increased capture" scenario although in some cases the "constant capture" scenario might be more appropriate. The additional

TABLE A
Minimum Recommended Parking Criteria
(Parking Spaces/ 1000 SF of GFA)

Source:	Eno (1) Foundation	Highway (2) Research Board	MAPC (3) Recommended Criteria
<u>TYPE OF BUSINESS</u>			
Retail Sales - Total	5.0	4.0	4.0
Comparison/convenience			5.0
			3.5
Professional Services (Medical, Legal, Real Estate, Insurance, etc.)	3.3		3.5
Personal & Repair Services	5.0		4.0
Bank-Business Offices	3.3	3.3	3.5
Restaurant			
Sit-down	7.5	9.0	7.5
Drive-in	23.0		20.0
Fast Food			12.0
Supermarket		8.0	8.0
Compact or Specialty Market			4.0

- (1) Eno Foundation for Transportation, Zoning, Parking, and Traffic, 1972.
- (2) Highway Research Board, Parking Principles Special Report 125, 1971.
- (3) MAPC criteria developed from adjusted minimums based on actual experience in Eastern Massachusetts.

- . congestion due to excessive on-street demand.
- . inadequate turnover of on-street spaces to provide for convenience needs.
- . inadequate enforcement of existing regulations.
- . adequate off-street parking that is split into many small lots making selections and search difficult and/or increasing traffic congestion.
- . poor relationship of off-street parking facilities to existing street system.
- . poor internal lot organization resulting in difficult search patterns and/or inefficient use of space.
- . poor aesthetics and/or poor relationship to pedestrian-circulation system in off-street lots.
- . poor maintenance and/or materials in off-street areas.
- . inadequate lighting.

Questions of lighting, aesthetics, and relationship to the pedestrian circulation system are critical and are addressed in greater detail in the pedestrian-circulation section of this manual. The central issues here are the nature, amount, location, and design of specific parking facilities. Improvements to the community's total parking arrangements may be divided roughly into on-street and off-street improvements.

ON-STREET IMPROVEMENTS

Most small-town centers have a heavy convenience orientation and have developed as much on-street parking as possible. Major expansions in this area are rarely possible although it is sometimes possible to slightly improve the efficiency of the layout. (More often, however, it will prove necessary to give up small numbers of on-street spaces to achieve improvement in traffic flow.) The major improvement that can

square feet of retail space should be added to the existing to evaluate parking required to accommodate it. Unless specific information is available to suggest that this expansion will occur disproportionately among the subareas, it should be divided proportionately between them. It should be pointed out that the additional square footage should be added for parking purposes even if all the increased capture is anticipated to go to increasing sales-per-square-foot. (The standards to be applied already should have been adjusted to reflect actual conditions.) Where specific areas or buildings for commercial expansion have been identified the new parking needs for that location should be allocated before the remaining future needs are appreciated.

Once a complete knowledge of the future conditions is available, the standards should be applied to the uses and activities as in the analysis of existing conditions. Surpluses and/or deficiencies should be mapped and the basic information made available from which a parking plan and program may be developed.

PARKING IMPROVEMENTS

Although the total amount of parking is certainly one of the most pressing issues for a town center, it is certainly not the only one. There are many issues which a community may wish to address in proposing improvements to its total parking system. Although no exhaustive list is ever possible, some of the major reasons for embarking on a program of parking improvements include:

- . inadequate existing parking, whether for the center as a whole or one or more specific subareas.
- . changes that will result in a loss of parking availability such as new development on an ad hoc-parking area or roadway improvements that remove on-street spaces.
- . expansion of retail activity resulting in increased demand for parking.
- . inadequate on-street spaces to serve specific convenience needs at a particular location.

In general, it has been assumed for purposes of this manual that all off-street parking will be provided in open surface-type lots. Although occasional garages, decks, or other arrangements are encountered, small town centers are served exclusively by surface lots as off-street parking in more than 95 percent of the cases. The discussion below therefore is confined to surface lots.

Location

The location and distribution of parking lots is crucial to their effectiveness in a town center. Several principles should be followed when locating new lots or evaluating existing ones:

- . Lots should be located close to the stores they serve. Maximum walking distance for convenience shopping is about 300 feet, for comparison shopping about 600 feet. Distances for employees and all-day parkers can be a little longer. Where possible, shops should have or develop entrances directly onto parking.
- . A few large lots are better than many small ones. Knowing where all the parking is to be found is even more valuable than having more parking. Many small lots induce inefficiency and frustration as a parker drives from small lot to small lot trying to find a space.
- . Planning for new or expanded lots should begin with considering existing vacant or underutilized parcels and relate to desire to sell and potential price. Condemning a property may be necessary but it is expensive and disruptive. If possible, parking should be developed with a minimum of disruption to a downtown.
- . Parking lots should be located so that they may serve more than one use. The time of peak use for different categories of users is frequently complementary such as residential and commercial or church and commercial. Locate lots to promote best efficiency of use.

Relationships to the vehicular-circulation system is a special category of locational considerations. Its single most important criterion is visibility -- in order for a driver to most easily become a shopper, he/she must be able to visually connect with parking easily. He/she

usually be made to on-street parking is in the turnover. On-street spaces are prime and are highly necessary to convenience-retail trade. Almost none of these parkers requires the space for more than an hour -- if they did an off-street space would suffice. Most towns have only a two-hour limit when a one-hour limit would be better. Metering parking is one means of achieving better turnover but most towns do not feel that this fits with their small-town image and/or that it could adversely affect business. Lowering the limit and enforcing it are more realistic means of achieving better use of existing on-street spaces.

The improvement of regulations and enforcement is probably the most frequently overlooked yet cost-effective means of improving parking conditions in a town center. And they can be implemented quickly. Big, new parking facilities may cost thousands of dollars and require months, sometimes years to put in place. Lowering the on-street limit to one hour and enforcing it with existing police presence need cost only a few hundred dollars in signs and can be in place in a matter of days or at most weeks - as much as doubling the effective capacity of the very best spaces.

For the cases in which physical alteration of curbside spaces is required, standards for these spaces are provided in the Appendix to this manual. In no case is angle parking recommended to expand total supply of on-street parking because it creates a significant safety hazard and may disqualify the community from some funding sources.

OFF-STREET IMPROVEMENTS

The major means for improving parking conditions in most town centers is through off-street parking. Vacant land may be developed, deteriorating buildings may be torn down, or lines on an old lot may need repainting. It is impossible to lay out all the possible approaches that might be taken to improve off-street parking. Much will depend on specific circumstances -- whether parking supply is to be expanded, consolidated or improved; what land is available, and at what cost; and how aggressive local merchants, officials and financial institutions are, etc. Instead of prescribing any specific course, general principles are provided that should assist in assessing existing facilities and in planning new ones.

Layout and Circulation

For lots to be efficient and easy to use, they must be properly laid out. In general, the most efficient layout will be with the aisles parallel to the long dimension of the lot. Where practical, this should be also the predominant direction of pedestrian flow to prevent excessive pedestrian/vehicular conflict. (Where this is not the case some parking should be sacrificed to provide a clearly delineated pedestrian path to the desired edge(s) of the lot.)

For efficiency, parking rows should be made as long as possible. User orientation, pedestrian safety, and improved access from aisle are important. Similarly, parking rows should be separated by pedestrian islands for access and safety.

Layout should be designed with the potential user in mind. The potential user wants to find a place to park, and efficient search pattern makes this easier. As in the case of space efficiency, long aisles make for easy searches and short-cross aisles induce uncertainties and confusion for the motorist. It is often tempting to carry the parking directly to the street to get an extra two to four spaces. This should not be done because it forces people to use the street to re-start a search inducing street congestion and difficulty in continuing a search. All searches should remain exclusively within the lot even if a few spaces must be sacrificed. By the same token, no layout should be used to permit an existing parker to back into the street.

For larger lots with two or more aisles, a continuous circulation pattern should be employed. For very small lots that use only a center aisle, every effort should be made to provide access at both ends. If this is not possible, a reserved turnaround or an extra-width aisle must be provided to accommodate vehicles piled in the end spaces.

Entrances and exits to lots should be of adequate width and clearly marked. One-way circulation systems should be clearly indicated. In general, entrance and exit-widths should correspond to aisle width. The number of entrances and exits should be kept to a minimum. A few, spacious entrances with good internal circulation are far superior to many. (If entrances and exits are separated the exit always should be down stream of the entrance for the flow of traffic in the adjacent lane.)

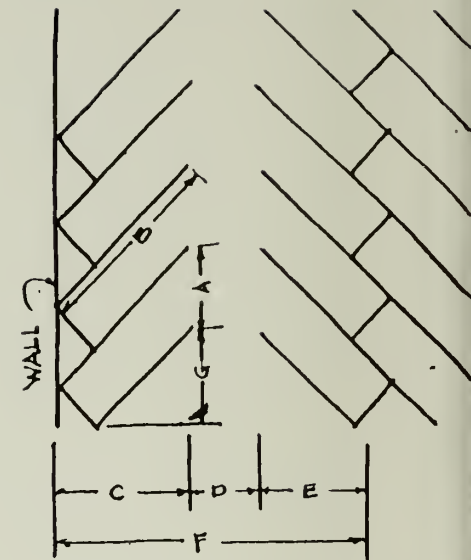
must be able to orient between it and the stores and the road system. Direct visual contact is best, of course, but this should be achieved in a manner in which the parking does not come to dominate the downtown scene. (Landscaping is not a luxury; it is essential.) As with location in general, several principles apply:

- Parking should be located on or immediately off the main through-routes. Where possible, it should be clearly visible from that route to help orient the driver. Where not possible, it should be clearly signed at inviting major streets (not at dingy alleys!) possibly indicating number of spaces.
- In one-way or partial one-way circulation, the parking should be located directly on one of the major roads, preferably the more heavily travelled. Access from other major roads should be provided, where possible, to prevent unnecessary circling through town.
- Where major through-routes traverse the center of town, parking should intercept as many users as possible before it is necessary to cross Main Street.

Dimensional Requirements

When initially examining an area for parking suitability it usually is adequate to estimate the total number of spaces that can be provided from the gross land area. On this basis, you should allow about 350-400 square-feet-per-space for all parking elements including the stall itself, aisles, landscaping, entrances, maneuvering, etc.

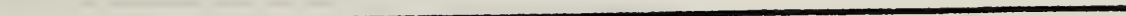
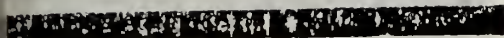
Once actual design is undertaken, however, more specific dimensions must be used and an actual layout developed. The angle selected for parking greatly influences the efficiency and operation of the lot. In general, 90° parking is the most efficient user of space and allows for the most flexible designs -- two-way aisles, etc. It does, however, necessitate more difficult parking maneuvers. Angle parking, usually either 60° or 45°, absolutely requires one-way circulation if they are to achieve their ease of use. They do, however, allow parking to be developed in very narrow locations.



PARKING DIMENSIONS 9' STALLS

	45°	60°	90°
A	12.7	10.4	9.0
B	25.0	22.0	18.5
C	17.5	19.0	18.5
D	12.0	16.0	26.0
E	15.3	17.5	18.5
F	44.8	52.5	63.0
G	11.0	8.3	0.0

SOURCE: HRB PARKING PRINCIPLES



Adequate reservoir capacity should be available to hold incoming vehicles unable to find free stalls. By the same token, if payment or validation is required, adequate capacity must be provided for the delayed incoming or outgoing vehicles without interfering with either internal flow or flow on the streets.

Although bus access is frequently not an issue in parking areas designed to serve the small downtown, it must be provided for in parking facilities developed with state (MDPW) funds. In these instances additional allowances for space will have to be made and bus oriented amenities should be located at the rear of lots, away from stores, to minimize conflicts with business policy. ■

- Parking and Loading Zones - including size and location, no-parking areas, meters, taxi zones, bus stops, striping of parking, etc.
- Traffic control devices - including locations and phasing of all signals, special actuation or timing arrangements, indications of signal faces, stop, yield, and do-not-enter signs, etc. Signs indicating relevant features such as parking, transit, etc. also should be inventoried at this time.
- Fixed facilities adjacent to the roadway - including all items that will need to be relocated when altering the roadway such as electric and telephone poles, hydrants, street lights, police and fire call boxes, trees, planters, and benches. Special attention should be paid to the location of drainage structures, such as catch basins, since special provision will have to be made for these and to buildings, bridge abutments, retaining walls, etc. that affect signal lines and the ability to alter a roadway at all. Underground utilities -- water, sewer, drainage, electricity, telephone, etc. -- should be located if possible.
- Topography - not usually included in roadway-improvement plans, may be necessary where sight lines or grades could become a problem. These should be related to some benchmark and mapped within a half a contour interval. (A contour interval is usually set at one-to-two feet for this type of survey.)
- Other features of interest - such as a fire and/or police stations, hospitals, an industry that must handle large volumes of traffic in a short time, transit parking, railroad stations, watercourses, etc.

Once mapped it is often necessary to have additional information about the features of the vehicular-circulation system including:

- Roadway materials and conditions - including bit nimous vs. concrete pavement, excessive breaking or potholes in the street surface, curb type and reveal, sidewalk material and condition etc.
- Transit schedules - arrival and departure time, destinations, and routes of all scheduled transit including bus, train, etc.

Traffic

Most town centers in eastern Massachusetts were not designed to accommodate automobiles. It is not surprising then to find that traffic is a common problem in these centers. Like parking problems, traffic problems should be defined through personal experience and technical analysis, and the appropriate solutions sought. The purpose of this section is to provide insight into the dimensions of traffic problems and the nature of possible improvements. Design techniques MAPC has found most helpful in small older downtowns will be reviewed.

There are a variety of traffic study techniques available to traffic planners and engineers. These range from multimillion-dollar studies of every factor that might impinge on traffic generation to a volunteer counting cars at key intersections. Like market analysis, the project committee must decide on the level of detail it needs to solve traffic problems and select the appropriate personnel for the job. Although much may be achieved with local talent, traffic problems are complex and will frequently require expert engineering assistance and will certainly require professional engineering design if construction is contemplated. Whatever the level of study, the traffic analysis should first inventory the basic transportation system including a review of any past studies, and then analyze the operation of that system.

SYSTEMS INVENTORY

To inventory traffic patterns, the field studies most often used by MAPC are a circulation-systems inventory, volume counts, and turning-movement counts.

CIRCULATION-SYSTEMS INVENTORY

The inventory of the vehicular circulation system, or the way traffic flows, is a crucial first step which involves extensive mapping of roadways. Much of the needed information already may be on your base map and only supplemental information need be gathered. It is important that all roadway features and dimensions be located fairly accurately (within about half a foot) as many traffic recommendations are dependent on available land area.

The major features to be mapped include:

- Roadways - the roadway right-of-way and the location of the roadway within the right of way including curb locations, curb-to-curb width, radii at corners, curb cuts, etc. One way streets should be indicated. Bridges and their dimensions should be noted. Much of this information is available through the Mass. DPW "Roadway Inventory"

Two adjustment factors are required: 1) the ratio of the volume for the day of measurement to the average day of the week, and 2) the ratio of the month of measurement to the average month of the year. These adjustments are multiplied together times the measured volume to obtain the directional AADT (Annualized Average Daily Traffic) for each street of a downtown (see Appendix for example).

These volumes are crucial to the evaluation of the vehicular-circulation system and suggestions for its improvement. Although conditions will vary widely, a directional AADT in the five-10,000 range on ordinary downtown streets would be significant.

While ATRs are helpful in showing traffic variation over the course of several days and in establishing the representativeness of the cordon count, they cannot yield the level of detail that the manual cordon count does. In addition, published data is often available for a nearby location. These data can be used for adjustment and verification of a cordon count, thereby making the ATR count unnecessary.

If ATRs are used they should be set up on a major through-route and a local route at or near a cordon point. It is usually not necessary to measure traffic volumes at all cordon points but ATRs counts should correspond to the same time periods as manual traffic counts for purposes of verification and adjustment. The purpose of these counts is to obtain average daily traffic (ADT) volumes or annualized average-daily-traffic (AADT) volumes for downtown streets. No matter what technique is used, adjustments will have to be made to the data as discussed above.

TURNING MOVEMENTS

Usually the most important factor in town center traffic problems is intersection congestion. This may be the result of any number of factors; e.g. a high proportion of left turns, improper signal phasing, or poor intersection geometry. In order to determine the level of operation of an intersection and to prescribe measures for improving it, all vehicular movements through it must be counted. In this study, peak volume is being sought rather than average volume.

The appropriate count may be obtained by simply counting the highest (or busiest) hour of the highest day of the week to obtain design-hourly volume (DHV). Business and shoppers surveys, ATRs, and personal experience has shown that the highest hour usually falls between four and

- Roadway classification - both functional and for funding. Both may be obtained from an outside source such as the state DPW. Functional classification for downtowns will generally fall into one of three classes: minor arterial routes - the major through-routes generally identifiable as state-numbered routes; collector streets - major streets that carry traffic between arterials and other areas of town; and local streets - the streets that primarily serve only adjacent uses.
- Regulations - all regulations that apply to traffic flow such as speed restrictions, weight limits, truck bans, special parking restrictions, etc.

VOLUME COUNTS

One of the most important characteristics of vehicular circulation is total volume. Two effective ways to measure volume in a downtown are with automatic traffic recorders (ATRs) and cordon counts. Of the two, the cordon count is the most valuable and is basic to the study of traffic. The same cordon that was used for parking is used for traffic, counting all vehicles which cross the cordon line. These counts generally are recorded every 15 minutes and are made directionally - that is they distinguish between vehicles going in and those going out. Vehicles may be classified -- cars, trucks, buses, etc. -- and pedestrian traffic noted. This establishes the proportion of vehicles with special requirements for roadway geometry or weight limits. It also permits adjustments to be made to ATR data since ATRs record axles, not vehicles. Under this classification system, the following classifications are used: small trucks (pickups, vans) are cars, motorcycles are cars, and bicycles are pedestrians.

It is useful to adjust volume counts to reflect the day of the week and the time of year. If ATR data is available, the day of week adjustment may be derived directly from it. If not, it may be inferred from a combination of data from business and shopper surveys, published data and the experience of other nearby communities with similar traffic patterns. In any case, the ATR data should be verified by comparison with published data.

OTHER STUDIES

As indicated previously, the list of potential studies of town center traffic is almost endless. Two others worth mentioning here are the travel time and delay study and the origin and destination (O&D) study. Travel time and delay studies are used in evaluating obstacles or friction-to-movement in a town center area. O&D studies are used in evaluating alternative routes, often outside of the center, or radically altered internal circulation.

For a travel time and delay study, the test car method is best for town centers. It involves making several "test runs" over desired route(s), each time measuring running time, stopped time, and time from start to finish. Special note should be made of delays and the route(s) should be measured in both directions, two or more times for accuracy. In a downtown with few major routes it should be possible to test major routes between gateways (and perhaps some minor routes and gateways) in a day or two. Measurements should be made during peak periods and supplemented by measurements in the other peak periods and during off-peak times.

Because of the complexity of any significant origin and destination study, it is not always feasible during town-center-planning efforts. Since the major item of interest in most town centers, however, is through-traffic routing, a small study might be considered. By identifying major through portals and stationing recorders at them, vehicles entering and leaving the center may be recorded. Recording should be done during the same periods as the turning movement count and each vehicle should be individually identified, usually by the last or first three characters of its license plate. By recording all vehicles in the same way and matching license plates the pattern, or so-called "desire lines" of through-traffic may be estimated. No vehicle that spends an abnormal amount of time in the center should be included in these calculations since it probably had a destination within the center and is not part of through-traffic.

This simplified form of O&D study should make it possible to examine various alternative routings for through traffic. It should be pointed out, however, that even in this abbreviated form, the matching associated with the O&D study will involve considerable effort.

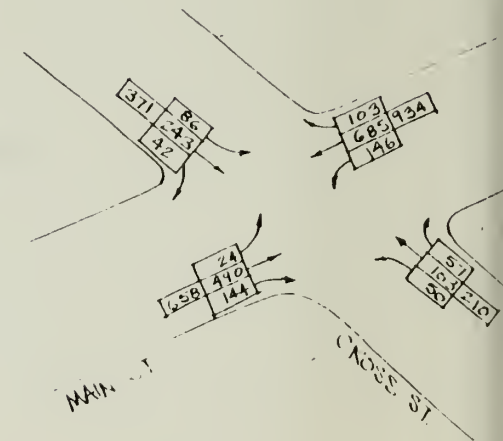
six in the evening. Auxillary counts are normally conducted between 7 and 9 a.m. and 11 and one for midday peak. These additional counts insure that turning movements during the morning and evening peaks would not render improvements, based on the weekly high hour alone, ineffective.

Techniques for counting vary slightly by intersection but are basically the same. An individual is responsible for noting all traffic entering the intersection from one or more approaches (depending on volume) and recording the route by which it leaves. Counts are tallied by a brief interval (usually five to fifteen minutes) and recorded over a two-hour period. In the case of a signalized intersection, the recorder also should note how many cycles of the light passed while a continuous flow of traffic entered or attempted to enter the intersection. In making judgements about signal cycles, some gaps in flow may be tolerated. Certainly as long as anyone is waiting to make a left turn the cycle is still in use, but the flow should be more-or-less continuous. Cycle information will be used to develop the load factor for the intersection. Load factor is defined as the ratio of completely used cycles to total cycles, and is important in evaluating the relationship between traffic volume and intersection capacity.

Based on turning movement counts, the heaviest hour should be selected for each intersection. Separate morning and evening peaks should be calculated. Information should be represented graphically on a large scale plan or on a schematic drawing of the intersection. These figures may be adjusted for time of year as in the case of AADT, but unless the area is highly influenced by something like seasonal recreation, this adjustment will probably be quite small.

In addition to the load factor discussed above, a peak hour factor, or phf, should be calculated for each approach. The phf is defined as the ratio of the total peak-hourly volume to four times the highest 15-minute count. It is essentially a measure of how "bunched" traffic tends to be and varies from a value of 1.0 for a completely even distribution to 0.25 if all traffic within an hour occurred during a single 15-minute period. (It is the need for the phf factor that has led to the specific choice of a 15-minute recording interval.)

Turning movement counts should be conducted at intersections where improvements are being considered and/or where there is significant congestion. If a recent study includes turning movement counts, it may be possible to only count some intersections and update figures on others.



SAMPLE TURNING MOVEMENT DIAGRAM

GENERAL OBSERVATION

To be most effective, observations should be written down as annotations on a base map, and related to traffic conditions. Observations should attempt to note anything that could represent a safety and/or operational problem within the town center. Possible observations might include:

- . Signal timing at Cross and Main favors Cross causing back-ups on Main.
- . Left turns from Main to Cross back-up traffic on Main.
- . Total jam at rotary, no-one can move at rush hour.
- . Double parking at the Post Office causes jam on Main Street.
- . Several near misses at blind alley, mid-block Main - pedestrians and cars. This may be expended to a "conflict analysis" in which conflicts at entrances and exits, with particular turning movements and with pedestrians are mapped and analyzed for problems.
- . Back-ups where bus stops in front of bakery unless bus pulls all the way in - bus rarely pulls all the way in.
- . Deliveries at the grocery are at a bad time - cars frequently parked in loading zone.
- . Trucks have trouble making right turn onto Main from Cross - causes delays, etc.

Almost anything can be significant. The purpose of general observation is to provide common sense support for other technical findings.

TRAFFIC TRENDS ANALYSIS

Future traffic levels are important in planning roadway improvements. In town centers, traffic levels are usually projected five to ten years from the time of study. (Larger facilities such as expressways or bridges, are planned for longer design futures - twenty to thirty year.)

OPERATIONS ANALYSES

Analysis of traffic data provides the basis for recommended roadway improvements. Like the studies discussed above, data analyses can be done in many ways. For town center planning, analyses should be kept simple.

The most important questions concerning traffic for a community are:

- How safe is my traffic system -- where are its pitfalls and how might I correct them?
- How well does my traffic-circulation system operate -- where are its bottlenecks and what causes them?
- And, how should I expect traffic levels and patterns to change over the life of the project -- will they grow or shrink and by about how much?

These questions are fundamental to the three operations analyses used most frequently by MAPC in studying traffic conditions: the safety analysis, the level of service analysis, and the traffic trends analysis.

A fourth, more informal analysis that is also valuable, is simple observation. Formal analysis cannot substitute for the kind of understanding that comes from direct observation of a traffic system. Although technical experience helps in knowing what to look for, the knowledge of someone familiar with an area will often be more valuable than the opinions of an expert professional that are based on limited field experience.

so even major new developments nearby may have little effect on local traffic.

If a market analysis is done as part of your revitalization study, the trend line should be adjusted to reflect the market results and recommendations. If market growth is anticipated, new trips must be estimated. (Trip generation rates for businesses are included in the Appendix.) It must be remembered, however, that new trips apply only to new or expended businesses. The increased sales due to population and income increases should already be reflected in the adjustments to the trend line. It is not suggested that increases be evaluated for separate streets or areas of the town center unless specific circumstances necessitate it. Traffic changes should be averaged and applied to the center as a whole.

SAFETY ANALYSIS

A safety analysis should always be conducted when traffic improvements are under consideration. Its purpose is to determine the nature and extent of safety problems including identifying dangerous intersections or stretches of road.

The basic tool of the safety analysis is the accident analysis and the best source of information is police records, although the Mass. DPW also maintains detailed, computerized records available on request. These contain not only location, injuries, etc. but often specific information on the cause of accidents like darkness, excessive speed, drinking, etc. When available, note the specifics including:

- location,
- severity of injury to person(s) and property,
- time of day,
- day of week (with special reference to holidays), and
- type of accident (Eight basic types are angle, rearend, head on, sideswipe, hit fixed object, hit parked car, pedestrian and bicycle. In addition, an "other" category is generally included for backing vehicles, vehicles out of control, etc.)

A five-to-ten year projection period is used for town centers for several reasons.

- . Town centers draw on relatively small areas for their traffic, both as source and destination are very susceptible to unpredictable changes like a major plant opening or a new mall. Traffic predictions for a town center, therefore, are frequently unreliable beyond the short-term.
- . Major traffic loads in most towns are carried by highways outside of the downtown. This makes long-range projection for the town center difficult and, to a degree, unnecessary.
- . Improvements considered for town centers are usually small and relatively inexpensive making longer range projections unnecessary.

Once the target date for design improvements has been established, the technique for projecting growth is relatively straightforward. The basic element of projection is the historical growth pattern of traffic in the surrounding area. The Massachusetts Department of Public Works (MDPW) annually publishes historical records of all traffic counting operations it supervises within the state. Since most town centers are located on state routes, it is likely that some data will exist for one or more downtown routes. Use data on these routes as growth indicators and draw a trend line from the historical line. This may be done visually, i.e. without elaborate mathematical estimations.

In addition to local routes, other nearby routes should be examined. Large routes of regional significance such as interstates, especially those that have opened or expanded during the historical period under study, should be studied. Use the trend-line growth rate as the base rate of traffic growth. Modify it by other factors like projected population and employment levels. (These may be available from a market analysis or may be obtained at MAPC.) Other factors such as increases in personal income, business changes, or changes to the transportation system can cause a shift in traffic and should also be used to adjust the basic rate of traffic change developed from the trend line. Remember, most town center routes are relatively local

the ease with which a driver can negotiate an intersection depending on the direction of approach. Level-of-service is expressed in terms of a letter, "A" through "F" and may be thought of much like a traditional school grading system for intersection operation. Level-of-service "A" indicates a totally free-flowing condition, gradually becoming more congested with level-of-service "F" which indicates a jammed condition.

Strictly speaking, a level-of-service analysis is generally applicable to signalized intersections since, theoretically, intersections should be signalized long before they approach their capacity. In practice, however, the basic concepts may be applied to the through-legs of other non-signalized intersections and, with some modifications, to cross-legs as well.

The level of service analysis is based on the load factors (previously discussed) as shown in the table below.

LEVEL OF SERVICE TABLE

<u>L.O.S.</u>	<u>DESCRIPTION</u>	<u>LOAD FACTOR</u>
A.	Free flow	0.0
B.	Stable flow	0.01-0.1
C.	Stable flow	0.11-0.3
D.	Approaching unstable flow	0.31-0.7
E.	Unstable flow	0.71-1.0*
F.	Forced flow	--

Source: Highway Capacity Manual - 1965

The importance of this measure to intersection congestion is seen in the average delay experienced by an individual at various load factors.

Accidents are generally surveyed for the entire town center. Emphasis is placed on intersections and results are mapped onto a large-scale map. (See example in Appendix.) Results are obtained for a minimum of one year, with preferably two or three years. Results are usually tabulated according to the above categories for the center as a whole and for individual intersections. The significance of these results is generally self apparent; accidents at night suggest lighting and visibility problems; angle collisions at an intersection suggest the need for better control; rear-end collisions suggest excessive queuing; etc.

Two techniques are useful in evaluating particularly hazardous locations - the hazard index and the intersection-accident rate. The intersection-accident rate is a fairly simple measure and may be calculated by simply dividing the number of accidents by the total number of vehicles using the intersection during the period (calculated from the AADT). This is usually expressed as accidents-per-million-vehicles. The hazard index is complex and recognizes both the problem of accidents of ranging severity and the problem of accidents on increasingly congested roads. The hazard index should be used for all key intersections if it is used at all. It is recommended that special consideration be given to the consideration of fatalities under this technique. When examining a town center which may have only a single fatality of record during the course of several years, the inclusion of the extremely heavily-weighted fatality could lead to misleading results. It is suggested that it be evaluated both as a fatality and as a personal-injury accident and the relative merits of each approach studied before any final decisions are made. The method used to evaluate it is contained in the Appendix.

By mapping the distribution of hazard indexes and intersection-accident rates as well as tabulating causes, a safety analysis is developed. From such an analysis, appropriate safety recommendations can be made.

LEVEL OF SERVICE ANALYSIS

A level-of-service (l.o.s.) analysis is the basic measure of operational efficiency and like other traffic analyses in town centers, it is best applied at intersections. It measures how well an intersection functions in terms of its traffic-handling ability. Although it is a quantitative measure, its purpose is more qualitative as it estimates

TRAFFIC IMPROVEMENTS

The traffic analyses outlined above are generally sufficient for the town center studies. When they are not enough, it is often because a problem is well beyond the capacity of local planners and project committees, and outside help must be sought. In the vast majority of the cases they are sufficient, however, and the community can begin exploring the possibilities for improvements.

Like the analyses that go into understanding the traffic situation in a town center, the approaches, strategies, philosophies, and techniques for potential improvements are nearly endless. Each consultant or planning group is likely to have favored approaches that result in improvements with varying degrees of desirability from the community's point of view. There is no single right answer to the question of how to improve traffic in a town center. Unfortunately, there are quite a few wrong answers. This section is aimed at helping communities avoid mistakes. It outlines four basic approaches to traffic improvement that are compatible with its other center-revitalization goals (e.g., retail sales, image, etc.). These are:

- Bypasses or alternative through-routes.
- Alternative-circulation patterns.
- Intersection improvements, and
- Regulations.

Basic to all types of improvements is certain geometric information. For example, the width of a travel lane is usually 12 feet but under extremely tight circumstances can be as little as ten feet (excluding parking). With multi-lane circulation systems, travel, or special turning lanes may be 10-11 feet wide and in areas with frequent curbside parking activity and a heavily used single travel lane it may be desirable for the travel lane to be up to 15 feet wide. (These refinements are usually worked out in detailed designs.) A parking lane is usually eight feet wide.

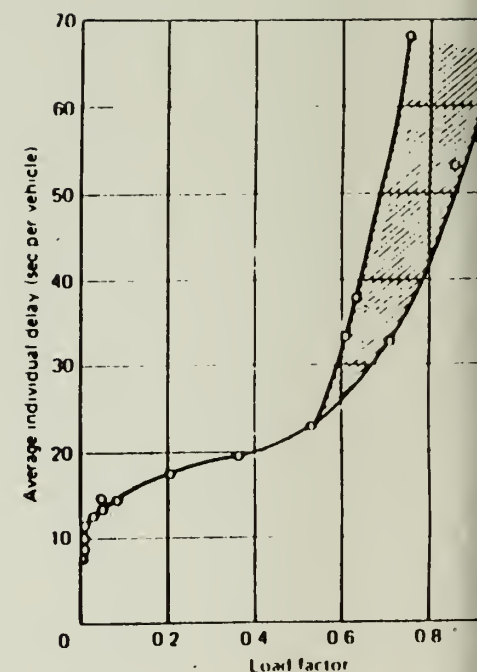
For circulation improvements, ideas must be generated and the results tested both singly and in combination with other ideas for functional and aesthetic suitability. A bypass might relieve traffic

The intersection capacity related to the characteristics of the traffic trying to use it is the basis of the l.o.s. analysis. Using such factors as total volume, left and right turns, street width, parking, trucks and transit, traffic bunching, one- and two-way streets and even an estimate of "driver skill", an intersection is graded with a series of charts and tables. A streamlined version of this technique that is suitable for planning purposes is detailed in the Appendix with charts, tables, the evaluation form, and a sample analysis.

Although, as mentioned, the principle means for obtaining level of service at intersections is by measurement of load factors, it is usually helpful to evaluate it by a capacity and traffic analysis as well. This helps reveal weak points in intersection operation. It will also provide base data on capacity and operation that is helpful in intersection redesign, rephasing and retiming signals, etc.

Also developed as a part of the level-of-service analysis should be a queue analysis. A queue is the line of cars that develops while waiting for a light to turn green. It may be calculated by using capacity, approach volume, green-time ratio, etc. as developed for level-of-service calculations. The technique used for evaluating queue length is contained in the Appendix.

In congested, downtown areas the queue length can be more important than delay and level-of-service. When a queue becomes so long that it interferes with other elements of the circulation system, the congestion effects compound and the entire system can jam, despite the fact that no single element is over-taxed. Level-of-service and queuing analyses are valuable in evaluating potential improvements. Each alternative should be subjected to both analyses to test adequacy and relative merit. The goal to be sought is a minimum level-of-service "C" on all legs of an intersection and a level of service balance between all legs. It is often necessary to take what can be achieved, and improvement from level of service "F" or "E" to "D" will generally be perceived as a major improvement by those who use an intersection. Where low levels of service are all that may be achieved, it is sometimes necessary to place a disproportionate burden on a secondary street and hope that alternative routes can be found, especially if major queues appear likely to develop.



Delay related to load factor intersections from ITE, Transportation and Traffic Engineering Handbook.

establish where these destinations are when considering a bypass. While a bypass with one end that starts "no place in particular" can be quite successful if its other end goes someplace, a bypass that just bypasses without any particular attention to where people want to go will probably be unsuccessful.

Once beginning and ending points are established a look at your map will usually suggest possible existing routes. (If none are apparent, a bypass should probably be considered only with professional advice.)

If there are one or more possible existing routes, the best test is to drive them. Note the following on maps:

- . existing land uses adjacent to the proposed route.
- . typical roadway widths, especially of bridges and/or overpasses.
- . presence of obstructions or overhangs.
- . existing traffic control and intersection conditions.
- . existing traffic conditions (qualitative).

(An assessors map is ideal for the purpose since it shows lot lines and makes land-use assessment easier.)

Evaluate this information to determine if the route is suitable for use as a bypass. At this point, the work of the local committee is essentially complete. Final evaluation will depend on an O & D study by a consultant. The local committee only can decide if a bypass is a possible alternative.

CIRCULATION

Another major consideration in a town center is the overall circulation pattern. A better relationship between roadway capacity and demand is usually a project goal. There are three ways to address this: one-way vs. two-way operation, street closings, and street extensions.

congestion downtown but choke residential streets with heavy through trucking; intersection improvements alone may have little effect on downtown circulation but then combined with a one-way circulation system may achieve desired results; a median strip may prevent conflicting movements but be totally at odds with the image desired for the downtown. A word of caution. While it is not necessary to adopt the best functional improvements if they conflict with other downtown goals, it is necessary that improvements selected be functional.

BYPASSES

Since one of the most frequent problems in town centers is through-traffic congestion especially with truck traffic, some consideration of alternative routing is often worthwhile. The question of "a bypass" usually comes up.

There are two types of bypasses: one that is essentially a conversion of existing streets and routes, and one that is newly constructed. Many bypasses are a hybrid of the two, like those made up of bits of an existing route with additional legs constructed. The only type of bypass that can be examined by a local project committee without outside help is that of a bypass on existing routes. Even this type presents some problems to a local committee since the intersection geometrics, projected traffic volumes, adequacy of bridges and clearances, and even adequacy of the pavement section must be examined and necessary improvements estimated. New bypasses require a more sophisticated analysis. The techniques explored here are meant to be an aid in considering the question and deciding whether it should be turned over to a consultant for more definitive study.

The first thing a committee needs in considering a bypass is a good map, preferably one that includes surrounding towns, local interstates, nearby interchanges, and nearby population centers. USGS quad streets are ideal for this purpose since they also contain information about topography, waterbodies, and other development.

Next, it is necessary to have a good idea of where the through traffic wants to go and where it comes from. If there is a major interchange along a congested route, it is almost certainly destination. An area of industrial development, a population center, etc. are also likely destinations. It is important to

Major disadvantages of one-way circulation:

- some trips may be made longer due to lack of direct access, total travel in town center may be increased.
- Turning volumes will be increased at some intersections as drivers must "go around" to reach their destinations.
- double parking and standing sometimes encouraged due to extra street width.
- confusion may increase illegal movements, especially when a two-way street appears to have a natural continuation the wrong way along a one-way street.
- emergency vehicles must take more round-about routes.

It is important that advantages and disadvantages be discussed with all who will be affected, especially businesses and fire and police. If it is decided that the advantages of changing the circulation outweigh the disadvantages the effect on total capacity should be considered. This is normally done in terms of an intersection analysis by taking the existing/target volumes and turning movements and redistributing them according to the proposed one-way circulation pattern. The operation of each affected intersection should be evaluated as described in the l.o.s. analysis and if the results are satisfactory, the new circulation pattern should be considered for inclusion in the total improvements package.

Street Closings and Extensions

The main reason for closing a street in a town center is to simplify a circulation system. It is often found that some small streets have a nuisance value to main streets that far outweighs the traffic that they carry. This is especially true when left turns must be made off of busy main streets at odd locations or when turning cars tie up one stream of traffic by breaking into the stream on the opposite side of the street. In these cases, if access to adjacent uses is not critical, the street is often better off closed. Where some additional downtown goal may be realized by its closing, such as creation of a pedestrian mall or expansion of parkland, (see urban design section for further details), this is especially true.

One-way vs. two-way operation

This generally is viewed as replacing a two-way road with a one-way system. In considering this, it is important to first establish that conversion from one to the other is possible. Most systems have been designed for two-way operation and can operate in that manner. Parking limitations are sometimes necessary to resolve problems of width where roadways are too narrow for traffic levels.

One-way operation, usually has more stringent limitations. In general, it is not feasible to operate a one-way circulation system unless it can be operated as a "couplet", i.e., streets of similar capacity must carry one-way flow in parallel and opposite direction. Further, these streets must be relatively close together (usually within 500-600 feet) and be served by adequate cross streets at the couplet ends to permit access between the legs and to other major routes. Sometimes achieving this will require circulation adjustments such as street closing or extensions.

If it is believed that these conditions can be met, a consideration of the relative advantages and disadvantages of a one-way system should be examined before a detailed analysis is performed.

Major advantages of one-way circulation include:

- reduced turning conflicts at intersections which increases capacity and ease of operation.
- increased street capacity due to reduced mid-block friction (double parking, deliveries, parking maneuvers, etc.).
- increased pedestrian safety due to approach from one side only.
- better capacity for progressive or flexible signal phasing and timing.
- frequent use of less used parallel street for one leg thereby increasing effective capacity of entire system.

Rotaries, or traffic circles, are a frequent feature in eastern Massachusetts and often the cause of a capacity problem on a roadway. Rotaries base their ability to handle traffic on the weaving distance available for incoming and existing traffic to use the same section of roadway. To be effective, weaving distances must be long - in the hundreds-of-feet - yet most rotaries were designed for distances in the tens-of-feet. There is rarely any room to expand them in town centers. Since many rotaries are a sentimental and often historic downtown feature, removing them, which may be the only logical traffic solution, is often impractical for political or aesthetic reasons.

The principles for replacing a rotary or in improving a conventional intersection are about the same and there is one that must be kept in mind at all times - it must fit. While it is always possible to design an intersection with enough area to handle demand, the trick is to lay it out in the space available - space that is rapidly eaten up by competing demands for sidewalks, parking, and buildings.

Take what appears to be the best idea and test it for anticipated level of service. Level of service "C" or better is desirable.

Intersection geometry

The principal elements of intersection geometry are roadway widths and the radii or rounding that are applied to the corners. These are usually determined by the number of vehicles that are to be accommodated and any islands to be included. Although the angle of an intersection is usually fixed it can sometimes be adjusted slightly to make it more closely approximate to 90°.

Keeping in mind the basic dimensions of travel and parking lanes discussed above and the need to make everything fit, the key principles of intersection design are:

- . roadways should intersect at as close to 90° as possible for better vision, shorter crossing distances, etc.
- . through lanes on opposite sides of an intersection should be aligned, as should the edge of pavement.

The case for extending a street is often somewhat more difficult to make. The main reason for extensions is to carry heavy traffic loads from an existing low capacity street or intersection to a higher capacity access point. The possible routes are usually limited so only their desirability can be evaluated. Where the

possible routes are across vacant land with no major obstacles the evaluation is rather simple and depends solely on the estimated benefits. Where the possible routes involve at least some land-taking and demolition and/or significant obstacles such as a river, these actions, both from a political and a financial perspective, must be weighed carefully. Preliminary cost estimates should be developed.

As in the case of the one-way circulation pattern, the redistributed traffic pattern should be estimated and the overall effect on level-of-service and total capacity evaluated before any decision is made to incorporate an extension or street closing in your road system.

INTERSECTIONS

Intersections are the single most important determinant of traffic flow in a town center. Because they are usually spaced closely they are the leading cause of downtown traffic congestion. Often only two or three intersections control downtown traffic; sometimes a single intersection is the dominant determinant of traffic patterns. Because their role is crucial in traffic circulation, key intersections must be designed to provide the best service possible.

Techniques of improving intersection operation include adjustments to traffic control and intersection geometry. The basic elements of these are: roadway widenings, narrowings and turning radii; traffic control signs and lane stripping; channelizations; traffic signals; and parking and turning regulations. The precise mix of these techniques will depend on the requirements developed through the safety and operational studies discussed above and the proposed circulation system. As it is impossible to anticipate every condition that will be encountered in designing intersections, only general principles of design will be discussed for each major technique.

0

The following principles should be observed when designing islands and channelized intersections:

- . Islands should be arranged so that the driving path seems natural and convenient and there should be only one path per movement.
- . A few, large, well placed islands are better than many small ones. To reflect in-town conditions, all islands should at least be 50 square feet, triangular islands at least eight feet on a side, and elongated islands at least four feet wide and 12 feet long.
- . Islands should be offset from the edge of a route by at least two feet.
- . There should be adequate approach and end treatment to provide warning.
- . All radii should be adequate for use by the design vehicle.
- . Adequate visibility should be assured.

In addition to channelization, it is sometimes helpful to restrict the roadway in the vicinity of an intersection to travel lane(s) only. This can limit parking, improve visibility, and provide better pedestrian access. The edge of pavement should be offset from the travelled way by at least two feet. Paint can be used to indicate travel lanes in the restricted area which may extend from twenty to one hundred feet back from the intersection.

Traffic control

All intersections in a town center will usually require some form of traffic control. For low-volume intersections, stop signs are adequate. At higher-volume intersections more sophisticated forms of traffic control, such as signalization, may well be necessary.

The planning and design of signalization for a town center can be quite complex.

- . special turning storage lanes should only be provided for particularly heavy and/or conflicting volumes, and preferably in conjunction with a special signal phase (see below). Where turning volumes are not nearly equal to through volumes it is better to simply provide two or more through lanes with turning restricted to the outside lane(s).
- . lanes should be striped (painted) and restricted uses indicated.
- . stop lines should be adequately set back from the intersection to permit turning traffic to clear.
- . intersection design should permit unobstructed view of cross street and traffic.
- . corner radii should be adequate for the appropriate design vehicle. Usually either a SU20 or WB50 (see Appendix for vehicle definitions and required radii).

In heavily used intersections an additional design technique, islands are sometimes used. Islands create special channels of flow called channelization whose function is to segregate turning movements and to control and reduce conflicts at an intersection. Islands, by physically blocking prohibited movements and by isolating conflicting movements, achieve this. This approach is particularly valuable in intersections that are too wide and lack definition. Extra width can have exactly the opposite effect that it is normally thought to have, i.e., increasing capacity. If undefined, it can decrease capacity by allowing conflicting movements to take place haphazardly throughout the intersection. By channeling the movements into appropriate locations, uncertainty is avoided and proper operation restored.

Median islands are centrally located to cross movement and turning islands are located at the edge of the roadway. In particularly large areas or at unusually angled intersections, there may be a hybrid of the two types.

2

In addition to individual warrants, the progressive movement may be satisfied if an additional signal is necessary to control traffic on an approach to another signal within 1000 feet. The "combination of warrants" may be satisfied if no warrant is satisfied individually but 80 percent of warrants one through three are satisfied.

Satisfying one or more warrants establishes the need for a signal but it does not define how it should be planned. As mentioned before the goal in intersection operation is to balance the levels-of-service among approaches. This is generally accomplished by adjusting the length of green out of the total cycle (the so called G/C ratio) so that the volume to capacity ratios on each leg are roughly balanced. Signal phasing should be based on peak-hour conditions.

Other considerations include provision of special turning phases and total-cycle length. As discussed, it is generally not worth making special provisions for turning movements unless the total turning volume begins to approach the through-volume in relation to capacity. Time given to a separate turning phase must be taken away from through-phases. Ultimately the only test of a separate turning phase is to try it and test the resulting level-of-service. If an overall improvement results, the idea was sound.

Selection of a total-cycle length is similarly imprecise. Total-cycle length refers to the total length of all phases including special turning cycles, yellow indications, etc. In general, longer cycle times provide for greater total capacity due to start-up delays, yellow warning indications, etc. They also mean longer waits. As a rule, cycle length should be kept as short as possible to achieve the necessary total capacity. Generally, for a standard two-phase intersection it will fall between 50 and 100 seconds.

Other traffic signal considerations are fixed vs. variably timed, full and semiactuated controls, fire preemption, pedestrian selection, progressive timing, and signal design and placement. In general, these are best handled by a consultant.

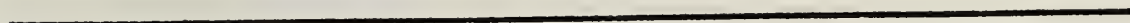
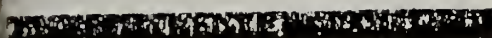
In order for traffic signals to be installed, an intersection must satisfy one or more warrants to establish the need. The purpose of warrants is to prevent the inappropriate installation of signals which encourage excessive delay, overlook alternative routes, or safety problems. The warrants are very specific and cover:

- . Minimum vehicular volume.
- . Interruption of continuous traffic.
- . Minimum pedestrian volume.
- . School crossings.
- . Progressive movement.
- . Accident experience.
- . System.
- . Combination of warrants.

The first three warrants mentioned above are usually concerned in planning downtown centers. The requirements of these are illustrated in the tables below. Traffic should be measured for each of any eight hours.

TABLE
Minimum Vehicular Volumes for Warrants 1 & 2

# of lanes moving Traffic—each approach		Warrant 1 Vehicles each hour on Major Street (Both approaches)	Vehicles each hour on Minor Street (One direction)	Warrant 2 Vehicles each hour on Major Street (Both approaches)	Vehicles each hour on Minor Street (One direction)
<u>Major St.</u>	<u>Minor St.</u>				
1	1	500	150	750	75
2 or more	1	600	150	900	75
2 or more	2 or more	600	200	900	100
1	2 or more	500	200	750	100



REGULATIONS

Traffic regulations in a town center can be implemented quickly and economically. Some examples of regulatory approaches to traffic problems:

- . Parking restrictions. Parking on one or both sides of key arteries and at corners can be restricted. All angle parking should be eliminated due to the hazards of backing into a moving stream of traffic.
- . Turning restrictions. Certain turning movements, especially left turns, can be restricted at high-volume intersections.
- . Truck ban. Partial (i.e., restricted to peak hours) or complete ban on through-trucking can aid a congested town center.
- . Speed restrictions. Although these usually exist, signs and enforcement may be infrequent or lacking, causing hazardous conditions.
- . Loading restrictions. Restrictions may be placed on curbside loading activities by restricting hours or location of activity.
- . Special enforcement programs, to eliminate double parking, restricted-zone parking, illegal turning movements, etc., can improve traffic operation.

A word of caution. Although opinion remains divided, regulations should either apply all the time or not at all. Parking and turning bans restricted to certain hours mean new patterns have to be developed for short times and they rarely are. The turbulence induced by traffic trying to get around the only car left in a peak-hour no-parking lane, for example, is often worse than if the roadway were organized into one less travel lane.

Although these represent only a few of the possible controls, they should be considered as part of the overall planning for traffic and parking. Used in conjunction with the other techniques outlined in this section, they offer solutions to the traffic and parking problems most frequently encountered in the town centers.■

Urban Design

Technical Data

poles, overhead wires, only to mention a few items, compose the big picture. The actual form or design of a town; its land use patterns, streets, sidewalks, buildings, and landscaping; its economic condition; usually signaled by its level of maintenance and new development; and its collective personality or special character - create a visual impact and impression on one's mind.



Every town creates an impression

Technical Data

A town has a distinctive visual character or image that is perceived by every individual in a slightly different way. This difference in perception is caused by many factors, such as the viewing person's place in both time and space and the viewer's social, educational, and psychological background.

A town viewed in the quiet early morning hours appears differently than the same town viewed during the busy afternoon rush hours or the late evening after businesses have closed. A town seen in late spring when the streets are bustling with people and the landscape is filled with fresh spring colors is perceived much differently than the same town seen in mid-winter when fewer people are outside, fewer natural colors appear in the landscape, and the ground and roofs are covered with snow. And the same hour of the same day on one year will reveal sights much differently five years prior.

If a person could be in two places in town at the same time, he or she would see two different views of a town because of the vantage point -- the direction he or she is looking. A view of the town from the east is different from the west, and a view from an elevated position is different at a lower position. The feeling and view experienced in a small enclosed space is different than in an open large space and the view at the edge of some place is different when set further back.

And equally important as a person's viewing time and position is his or her interpretation of what is seen. This interpretation is largely determined by a person's likes and dislikes, past experiences, tolerances and put quite simply -- his or her taste. Some people like contemporary designs, others prefer classics. Many people love crowded streets, and many can not tolerate them. Some people have been trained to appreciate subtle design qualities that others might ignore. For every view there can be a multitude of interpretations and judgements made.

But whenever, wherever, and however a viewer perceives a "townscape" he or she will see in the design many individual components that compose the whole image. People, animals, automobiles, sidewalks, streets, buildings, signs, trees, shrubs, benches, lights, utility



Trees, bollards and lights create texture in this open space

The outline of the skyline defines the scale and shape of the town. A line of trees, in the middle area, can lead the eye in a certain direction, and pavement lines on the ground suggest movement. (Parallel lines suggest constant movement while intersecting lines suggest stopping or slower motion.) The lines in an object or area help define uses while the outline of an object or area defines its form.

- . Form is the total mass - the filled-in shape or bulk of an object or image. A street crowded with closely-space buildings has a dense form, whereas a street scattered with few buildings and open space has a loose form. Individual trees, pieces of sculpture, buildings, etc. all have certain forms that, when combined, create the form of an area.
- . Texture describes the surface quality of something -- rough, smooth, silky, spikey, etc. Textures create visual interest. A change in pavement texture can arouse attention. A change in building texture can signify a change in use and contrasting textures of plantings can be used for emphasis.
- . Color, easily visible, produces emotional impacts on the viewer. Warm, vibrant colors, like red and yellow, advance toward the viewer and produce excitement. Cool colors as green and blue recede and produce calming reactions. Color is a powerful and delightful tool to use in design.

Line, form, texture, and color can be used to create variety, repetition, balance, and emphasis. Variety is the "spice of life", as the saying goes. Variety relieves boredom and monotony. Although too much variety can create confusion, when used in moderation it can give visual spark to a design. Repeating a color, texture, line or form, on the other hand, can create unity - a design with a sense of order or theme. (It is repetition that gives variety a meaning.) And balancing or emphasizing certain lines, forms, textures, or colors are effective methods of creating visual tension, interest, and purposeful designs.

THE DESIGN

For convenience in analyzing the visual design of a town, three major areas of concentration should be the skyline, the ground line, and the middle area. It is helpful to visually divide a scene into these three areas, analyzing each area individually and in relationship to the other.

- . The skyline is the line where the built environment meets the sky. The roofs of buildings, tops of trees, tall billboards, or anything defining the top outline of a scene is part of the skyline.
- . The groundline is the line where the built environment meets the ground. Streets, sidewalks, curbs, drainage structures and open grassy areas are generally considered part of the groundline.
- . And the middle area contains the building facades, landscaping, signs, pedestrian benches, lights, and other utilities. This middle area between the sky and groundline contains the most components and therefore deserves the most analysis.

These three areas combine to form a unified whole - a physical image. As stated before, the image is composed of many components, such as buildings, graphics, landscaping, and pedestrian amenities, and it is important to consider in analysis not only the individual objects, but also their relationship to the whole. The line, form, texture, and color of an object or a series of objects are important design considerations and their variety, repetition, balance, or emphasis helps to evaluate the design.

- . Lines define shapes, create patterns, and suggest directions.

Technical Data



Skyline



Groundline



Middle Area

Technical Data



A special sense of place



Ethnic attraction

THE CHARACTER

An area should not be visually analyzed only by the physical objects that form it, but by the unique "sense" that it has. The image of a town is defined by both its physical and social constituents. An area may have a predominant type of people, class, race, or lifestyle that gives it a special feeling. Certain products may be sold or certain activities might take place in the area, giving it an unusual or well-defined theme. A Chinatown, a little Italy, a garment district, an historic town, a fast-food strip, or an area specializing in high-quality boutiques are a few examples. A town center should determine whether it has a certain character on which it can tastefully build, or whether it must create a visual image or continuity in town through the use of design.

By identifying and accepting its present assets, a town can build upon its positive attributes to create a constructive town image. An asset might be a group of particularly attractive buildings, as many towns have. An asset might be an abundance of open space, parks, and landscaping. An old mill town might focus on its mill buildings or river and a coastline town might focus on its beaches and docks. Towns of strong ethnic background usually specialize in certain foods or wares that are an attraction to outsiders, and specialty shopping districts attract people. Charm, character, integrity, and a special sense of place are goals to achieve when developing a town image. ■

A visual description of an object or area can be easily made but it is more difficult to judge visual quality. A pleasant color, attractive form, or interesting texture are so only in the eyes of the beholder. There do exist, however, certain designs -- simple, compatible, and widely accepted, that a trained person can recognize and reproduce. A trained designer can combine visual quality with functional needs and a desired image.

Technical Data

should contain a low horizontal format. Roof-top billboards, projecting false facades, chimneys, antennas, and anything else on a roof are part of the visual outline and also should be included when analyzing the skyline.

The tightness or looseness of a town is defined by its buildings' placement, and when analyzing land-use patterns and development potential this is important to remember. Open space is important in a downtown area, but too much open space between buildings or groups of buildings can visually separate the town into different districts, disrupting the flow or rhythm of the street. Drawing an elevation of each street is useful in analyzing the height and spacing of buildings.

Elevations are also useful when analyzing the area of a building that is between the skyline and groundline. This middle area is the most visually prominent. The shapes of each building or row of buildings, positioning of windows, doors, vestibules and signs, the texture and color created by a building's covering materials, and the general maintenance of a building combine to create an overall appearance, building by building and block by block. It is in this area that one sees window displays, advertising, signs, and general storefront conditions which reflect merchandise quality within. It is also this middle area that offers the most potential for unifying or disrupting a town's visual image. Using coordinated or complementary awnings, signs and pedestrian amenities on buildings throughout a block, can produce a unified image.

Coordinating treatment at the groundline is also a way of unifying a streetscape. Vestibules, entryways, and stoops should be analyzed in relationship to their own buildings, those of adjacent buildings, and the surface of the sidewalk. For example, the paving material used for entryways could be the same as the material used for the sidewalk, or it can be totally different for contrast. Planters on planting beds at the base of buildings could be coordinated visually. Sidewalk treatment near buildings could be the same. The groundline coordinates the floor of a town.

When analyzing a buildingscape, the side's and back's of buildings should not be forgotten. They, too, give an important visual impression of an area. Seen from back-street parking lots, adjacent roads, or pedestrian alleyways, the backs and side's of buildings help



A continuous awning coordinates storefronts and creates pedestrian scale



Planters coordinated at groundline

THE BUILDING SCAPE

Buildings have a tremendous effect on a town's visual image. They are the most visually prominent and important physical elements of a town. Without them there would be no business district. Although streets, sidewalks, landscaping, and open space create very important visual patterns, it is the buildings that make the form, texture, and color of the built environment truly come alive.

The collective image of all the buildings or "buildingscape" in town should be one that is clean, pleasant, and purposeful. (Purposeful means that the layout and appearance of the buildings serve a planned purpose.) A row of buildings, or several rows of buildings should appear unified and coordinated throughout a business district. Buildings need not all be the same design, same materials, or same color. On the contrary, each building or block of buildings should maintain its own architectural character, original design, and unique look. A coordinated and unified look is one that shows that the merchants and building owners in the town are sensitive to each other and to the overall image the town is trying to achieve. Neighboring merchants should not put up signs that look incompatible -- such as a large purple aluminum sign next to a hand-carved natural wood sign. Neighboring building owners should not compete for attention by covering their facades with garish, shiney, attention-grabbing materials, or try to outdue each other with more or larger advertising. If a town is trying to achieve an historical image, fake tutor facades and neon signs would be clearly out of place. On the other hand, if a town's intended image is contemporary or eclectic in style, a pseudo-colonial or victorian facade would look ridiculous. A coordinated image is one where dissimilar buildings are brought into a unified, ordered, intended look.

A coordinated skyline has a pleasant and harmonious outline, mainly achieved through uniform heights and regulated spacing of buildings. Large height discrepancies are inharmonious. Overpowering tall structures amongst two and three story buildings not only look out of place but the taller buildings block the sun and shade great portions of the ground. Buildings should not all be the same height, either, for that repetition becomes monotonous. Varying heights create diversity, texture, and interest to the skyline, but a small town

Technical Data

Technical Data

- . Wood frame buildings still exist in most downtown centers. Most are two stories high, the bottom level usually commercial and the upper level residential. If these buildings originally were well-built and have been maintained, their life expectancy can be quite long. Many wooden structures dating back to the early 1700's still exist in New England.

VISUAL CONDITION

The visual condition of a building refers to its overall physical condition -- not its structural soundness. A building in good condition needs few physical repairs, while a building in poor condition will exhibit severe physical deterioration requiring extensive repair work. The condition of a building is often influenced by the amount of past maintenance. Loose mortar, chipped masonry, missing clapboards, falling gutters, and rotting windowsills are all examples of deteriorating conditions caused by lack of routine maintenance. Analyzing a building's condition will help determine the need for and feasibility of renovation and improvements.

HISTORIC SIGNIFICANCE

The historic significance of a building should be analyzed so future land-use or renovation decisions involving the building can be considered in light of the building's importance to history. A significant building is one which has had an important role in the history of the town or has a unique architectural style, designer, or quality of craftsmanship. If a building is historically important it should not be destroyed or defaced unless pressing economic or land-use decisions warrant its removal. (See section on Historic Preservation)

ARCHITECTURAL STYLE

Identifying the architectural style of a building is particularly important when analyzing storefronts or determining historic significance and improvement potential. Many towns have, in their central business district, residential-style buildings such as Queen Anne,

define the character of the area they abut. Many people often avoid an alley, parking lot or side street because it appears "seedy". This situation often can be remedied with some minor maintenance to the building's backs and sides with a general clean-up of the area.

Technical Data

THE BUILDING

Besides being responsible for composing part of the buildingscape, each building has a responsibility to maintain its own special character and pleasant individual appearance. When analyzing a building, especially in light of possible renovations, several factors should be taken into consideration -- the building's structural soundness, its visual condition, its architectural style, its historical significance, and its storefront.

STRUCTURAL SOUNDNESS

Evaluation of a building's soundness is extremely important when making land-use, renovation, or other decisions about a building's expected life. Besides natural and man-made disasters, the type and quality of construction of a building and consequent maintenance determines a building's life-span. Three major types of construction most commonly occur in New England's commercial buildings -- load bearing masonry buildings, reinforced cement concrete buildings, and wood-frame buildings.

- . Load-bearing masonry are the most common type of commercial building seen in New England. Made of brick, stone, or concrete block, these buildings are structurally sound and usually have a very long life. Not readily victimized by fire or harsh weather, the building's major enemy is neglect. Loose mortar, fragmented or missing stones, and holes in the structure encourage future deterioration and eventual crumbling if not maintained.
- . Reinforced cement concrete buildings are a more recent development in commercial building techniques. Typically used in buildings greater than three stories, reinforced concrete structures are also very durable and longlasting if originally built well.

"humanize" the building. Long, undivided areas of concrete or glass are less communicative and inviting to the pedestrian than smaller more intimate spaces.

Three typical styles of commercial buildings.



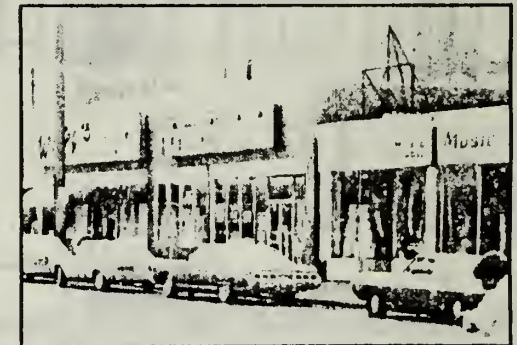
Greek Revival or Shingle Style. These buildings probably once were used strictly for residences, but have since been converted to commercial or office space. Although they usually represent a minor portion of the "buildingscape" their styles should be identified.

The majority of buildings in a business district were built for commercial use. Most business districts in the MAPC region demonstrate three typical styles of commercial buildings -- the early 20th century commercial buildings, the one-story commercial building built after World War II, and new modern commercial construction. It is helpful to understand the components or characteristics of each style.

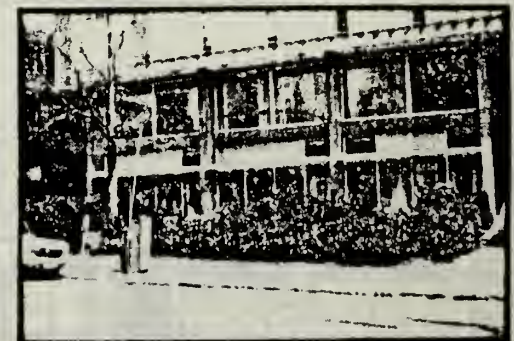
- . The late 19th and early 20th-century commercial buildings are usually among the oldest in many business districts. Many different "period styles" were imitated, such as the Federal, Italianate, Victorian styles, but the common characteristics of all are four horizontal divisions - the ground level/storefront, the horizontal-lintel separating floors, the stories, and the cornice. Some of the buildings especially the Victorian styles also were divided vertically by pilasters. These horizontal and vertical divisions establish a common order and rhythm to the variety of businesses and civic uses which usually line the street. Many modern storefront "renovations" have destroyed this order by covering or removing these divisions. This has led to a chaotic development of confused and uncoordinated storefronts.
- . Postwar commercial buildings are mainly one-story high. Usually built with limited budgets and speed, these buildings often show little concern for architectural details or fine craftsmanship. Because they usually lack a theme or continuity, it is often difficult to harmoniously integrate them into the streetscape with the older commercial buildings. Use of awnings, signs and materials compatible with neighboring buildings help these buildings establish continuity within a block.
- . New modern construction buildings usually continue a conventionally strong definition at street level. Columns, piers, mullions, etc. should be placed to establish a clear set of facade subdivisions if more than one tenant will use the space. In any case, modern construction should use pedestrian-scaled elements to



Late 19th - Early 20th century building



Post-war commercial building



New modern construction



An attractive window display

The key to successful design of a renovated storefront is being ever attentive to the original design of the building. The original dimensions should be maintained on the storefront determining the size and location of the sign, window openings, doors, and details. A professional architect or designer should be consulted for specific buildings.

Neat, attractive, clean storefronts give the building and the business within an organized, prosperous image -- one that attracts customers. Uncluttered, well-thought-out, modern-window displays that exhibit your best merchandise also attract customers. A handsome downtown center, strongly defined by the character of its buildings, is essential for a thriving business atmosphere.

STOREFRONTS

A storefront, usually on the first floor of a building, is the area most apparent to passing pedestrians and motorists. A storefront is a building's main display area - the place for "putting its best foot forward." A storefront should be critically analyzed for both its physical condition and design.

- The physical condition of a storefront is a visual evaluation. A storefront is in good condition if it needs only few repairs. The storefront may be unattractive due to design or choice of materials, but if its well-maintained, needing few repairs, it is in good condition. The storefront's surface materials, its window sashes and doors, its signs and lights all indicate a storefront's physical condition.
- The design of a storefront is another visual evaluation, having less to do with condition and more to do with aesthetics. A well-designed storefront should have pleasant proportions between windows, doors, and vestibules, should contain pedestrian-scaled elements and amenities, such as awnings and planters, should have attractive, well-placed compatible signs, and should maintain the architectural character of the building.



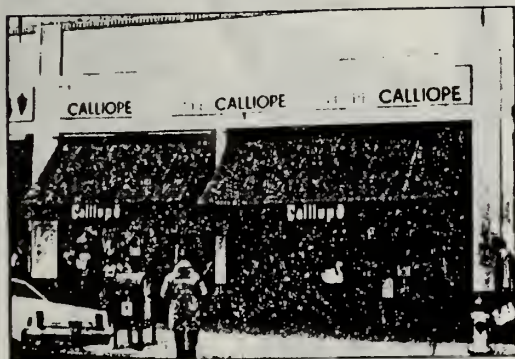
Placement of signs and maintenance help or hinder a building's design

Technical Data



Surface materials, signs, and amenities indicate physical condition

Technical Data



Materials should be the best affordable. A sign is a long-term investment, and good materials ensure durability, less maintenance, and long-term aesthetic benefits. Like a typeface, material conveys an image. Wood can be curved, laminated, painted, clear-finished, or weathered. It offers a variety of grains and textures. Metal, for its part, can be etched, cut, cast, embossed, wrought, rolled, or extruded. A range of coatings, finishes, and color is available, or a sign can be kept simply reflective. Metal needs minimum maintenance if the finish stays intact.

Cloth, glass, stone, and brick have their own distinct qualities. Lettering on glass (a storefront window) is inexpensive and is usually effective if the lettering is at eye level and occupies no more than 25 percent of the total glass area.

Plastic signs usually are screen-printed on vacuum-formed panels in a metal frame, or molded letters applied to the surface. Variety of shape, color, texture, and opacity are the attributes of plastic. Concealed or internal lighting is possible but should be used with discretion.

The color of a sign or awning should be compatible with those of the building and with neighboring signs and awnings. Varying hues and intensities of the same color can provide a consistent image or theme on a building or streetscape. Coordinated signs or awnings can unify a block of otherwise mismatched buildings.

When choosing colors, their effects should be considered: bright ones often create excitement, quiet ones suggest dignity or repose. The contrast between lettering and background colors is important too: dark lettering on a light background or vice versa is the most legible, but too much (like too little) contrast causes eye strain. Older buildings deserve signs that are compatible with their architecture. Subdued colors work best. ■

SIGNS

Signs contribute greatly to the character of a business district, significantly enhancing or detracting from the area's appearance. Signs seen from outside a building are designed to tell the public about the premises and interests of private or public firms, persons, or organizations. They attract the attention of pedestrians and motorists, provide directions or information, communicate ownership, and announce services and products. They create images for both the building and the center. The style and design of signs can convey an elegant or modest image, a conservative or progressive one. Signs may be painted on, incorporated into, or affixed to a wall, flush or perpendicular. The sign may be freestanding, on an awning or canopy, placed on the inside of a display window, or hanging like a flag. They come in many forms, colors, materials, and styles. Complementary signs, coordinated through the business district, can unify the streetscape, enhancing the image of the town and stimulating business. When considering sign characteristics, scale, color, material, and compatibility should be paramount.

- . The size of the sign should fit the storefront. Many buildings have a sign area within the design of their facade. Undecorated lintels (horizontal stones above windows and doors) often suggest placement and size for signs. Bays of the facade may establish the maximum width of the sign. A sign should be large enough to be easily read by a pedestrian or motorist but not so large as to cover architectural details on a building.
- . Word size should be between 1/3 and 1/2 the height of the sign area, with letters subordinate to background. The number of words should always be the least necessary, as simple designs are most readily comprehended. While choosing the style of design and the typeface, one should always consider the building on which the sign will be portrayed and the image one would like. Gothic and Roman (serif) typefaces are usually more elegant; contemporary typefaces (sans serif) are more modern.

Technical Data



Technical Data



A visual barrier



Enframing a view

Plants also help control the wind. They can block, direct or amplify the wind, depending upon the plant's height, density, shape and placement. Evergreens are most effective plants for year-round control, and deciduous plants can be used while in leaf. The type of plant, the number of plants, and the location will depend on the desired effect and direction of prevailing winds. Reduced wind, redirected wind, or filtered wind are obtainable effects.

Plants can be used to control views. A densely planted row of shrubs or evergreen trees can form a visual barrier to hide unsightly views. Plants can also attract attention to views by framing them, accenting them, or creating a backdrop setting. The ultimate size and branching habit of a plant will determine its effectiveness for screening, and its size, form and color will determine its accenting or framing abilities.

Plants can be effective physical barriers. The use of plants in mass or singly can direct traffic physically or visually by suggesting entrances. They can define a space by creating an architectural barrier (planted in masses they can block traffic, and thorny bushes are especially effective in discouraging passage). They can articulate a space by forming a wall, canopy, or floor in the landscape.

Erosion control, noise control, and air filtration are other values of plants, but of sufficient benefit only when used in great numbers. Many closely spaced plants with intertwining roots and branches can prevent soil from washing away. Tall planting masses, at least 25 feet wide, can absorb enough sound to dramatically reduce noise. And plants, acting as secondary filters, can remove limited quantities of sulfur dioxide and hydrogen fluoride from the atmosphere, while their leaves trap dust and soot.

"Landscaping" refers to human manipulation of the natural environment - the land. This section will deal with plants, only one of many instruments used to mold the landscape and image of a town. In earlier times, trees were planted in abundance throughout town centers, especially on the main street. Besides being beautiful they served the foremost purpose of reducing glare from the hot summer sun, thus keeping the horses from going mad. They also delineated the pedestrian path from the road and provided a canopy of shade. Today, we do not concern ourselves with horses on the street, but the aesthetic and functional uses of plants and the needs of the pedestrians should be analyzed.

USES OF PLANTS

Plants, throughout the ages, have appealed to people's aesthetic senses. Plants can produce moods because of their aromatic flowers, sounds of wind-rustled leaves, textural feel or their visual delight. They create pictures in the landscape. Rhythm or continuity on a street can be created with trees, a planting theme can be developed for a town center, and visual balance or emphasis can be added to a certain area. Poor views can be screened, and good views enhanced. Plants are an indispensable design tool for an urban environment.

As climatic control agents plants are used to alleviate heat, glare, wind or rain, and whether they are planted singly or in mass, plants can have a dramatic impact on the climatic comfort of pedestrians.

- Plants help alleviate the adverse effects of heat. Plants, especially trees, most helpfully produce shade throughout most of the year. This obvious fact is of incredible importance in the hot mid-afternoon hours when the sun beats down on pavement already radiating heat. The trees cool the immediate area (microclimate) by several degrees, they provide shade for pedestrian relief, and keep parked cars cool. In the spring and autumn months, when shade is less needed, they conveniently have fewer leaves, or lose all their leaves in the winter (deciduous trees) - exposing the ground to the warming and melting rays of the sun.

Technical Data



Constricted roots



Tree-grates allow air and moisture to reach the roots

Plants absorb water through their roots, some large trees averaging hundreds of gallons each day. A plant's roots spread nearly as wide as the plant's branches and as deep as needed to anchor the plant and absorb water. Some trees such as pines, have taproots nearly equalling their height above ground. When considering the placement of a plant, especially a tree, the extensive root structure should be a careful consideration. The plant should have adequate open ground space to furnish sufficient water to the roots. Root growth should not interfere with pavement or underground utilities. Roots are strong and over time they can buckle and crack pavement, corrode utility pipes, and clog drainage structures.

Prevailing winds also can affect a plant's moisture requirements. Winds cause a plant to evaporate water through its leaves, therefore causing a need for more groundwater. (A plant should never evaporate more moisture than it can take in.) If a site is particularly windy, plants with waxy leaves, thin needles or thick leaves should be chosen -- plants that are wilt-resistant.

Soil contains the basic elements essential to a plant's survival -- bacteria, oxygen, minerals, water, and decayed matter (humus). Different soil types contain these elements in varying proportions. Silt does not contain much humus or bacteria, whereas peat is rich in both. Sand will not retain water for long periods of time, whereas clay is extremely retentive. The structure or make-up of a soil can be changed with the addition of fertilizers, peatmoss, sand, or topsoil, but extensive soil reconstruction is not advised. Plants that are native to an area or site should be chosen. Only minor soil additives to ensure proper nutrients, water retention, drainage, and soil pH, should be needed. A soil analysis will help determine which major elements are lacking in the soil and which plants are best for a site.

CHOOSING A PLANT

Urban conditions produce a hardship on plants. Poor soil, polluted air, limited moisture, artificial lighting, reflected pavement heat, urine scald, snow removal chemicals, human abuse and general neglect adversely affects plants. To minimize harmful environmental effects it is important to choose the correct plant for the right location. Much consideration should be given to the intended function of the plant, the existing conditions of the site, and the plant's needs.

PLANT NEEDS

Plants have four basic needs -- light, moisture, soil, and heat. These requirements must be met in the correct quantity and quality to ensure a healthy, attractive plant. Each type of plant has different requirements and tolerances, so a thorough understanding of the plant material and the site on which it is to be planted is essential.

- . Light provides the plant with basic stimulation for its photosynthesis - the process which produces plant growth. Inadequate light seriously can retard plant growth, and artificial lighting, especially bulbs, retard plant dormancy causing damaging frost winter-kill. Some plants grow well in shade or limited light, as the dogwood, or beech; while others, as the willow or pine, prefer full sun. The plant's light requirements must be compatible with the amount of available light at the site, so before a tree or shrub is planted the shadows cast by neighboring buildings, trees, etc., should be taken into consideration. The type of artificial lighting should also be carefully considered.
- . Moisture supply affects the growth and form of a plant. Not only is water, itself, needed for a plant's structure, but combined with groundwater are the minerals essential to a plant's health. The amount of rainfall and ability of the soil to retain moisture determines availability of water for a plant. Humid air can help keep a plant from wilting but the main source of moisture for a plant comes from the ground.

Technical Data

Technical Data

Visual Characteristics

Besides environmental requirements, a plant should be chosen by its visual characteristics - form, size, texture, and color.

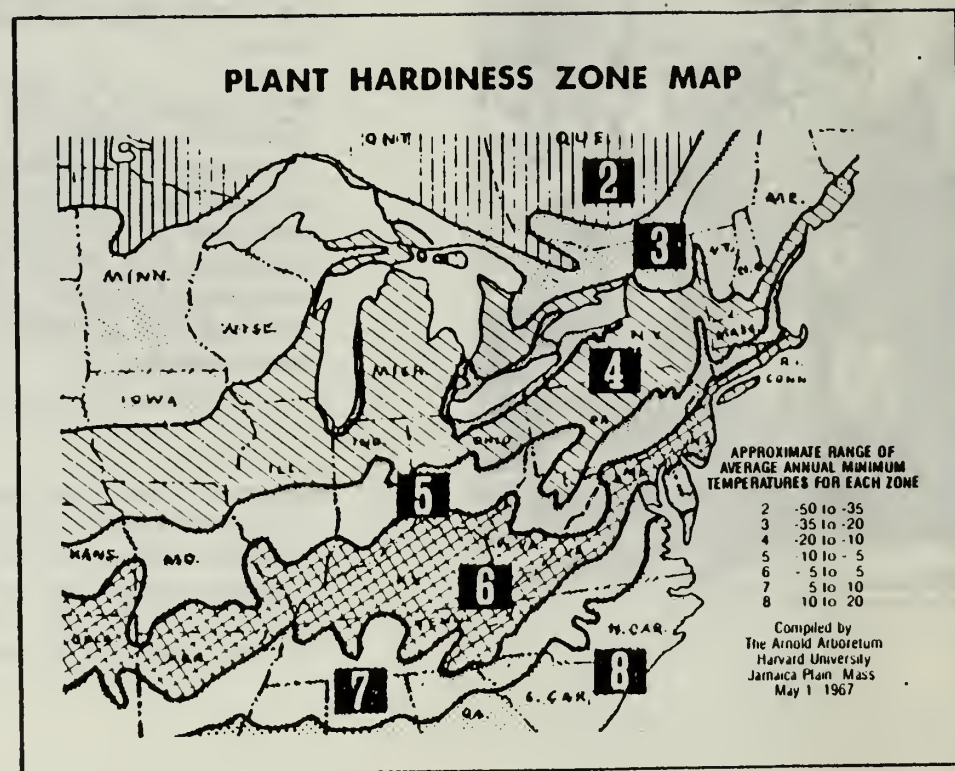
- The form of a plant refers to its natural overall shape, with or without its foliage. A plant can be round, columnar, pyramidal, weeping, or many other possible shapes. The form of a plant can determine its design effectiveness. High branching concave-shaped plants form a good canopy that cars and people can pass under, while low branching pyramidal plants form a good screen or wall. A round weeping tree is a handsome single specimen, whereas a tall columnar tree is better in a group. Low, flat, horizontal shrubs make good ground covers, and upright boxy shrubs make good hedges. Whether a plant is to be used as a specimen or in mass, consideration should be given to its form.
- The size of a plant is very important. Because plants are constantly growing, their sizes change over the years. A planting design should plan for the ultimate height and width of a plant at maturity. A young tree may not interfere with overhead utility wires and adjacent buildings when newly planted, but problems can occur later in time if the tree's ultimate size has not been considered. To avoid unattractive pruning and possible removal of a plant in its mature years, plan ahead.



Unattractive pruning

Technical Data

Heat requirements for plants vary. The ability of a plant to withstand extreme heat or cold determines its hardiness. The United States has categorized plants by their hardiness into "zones". Massachusetts falls into Zone 4 so, conceivably, all plants labelled Zone 4 could be used. However, it is very important to analyze the micro-climate of a site before selecting plant material. Areas on the north side of a building generally are colder than areas on the south side. Prevailing winds might change the temperature of an area, as might shadows. Heat radiating from pavement increases an area's temperature and large bodies of water decrease it. These "micro-climate" considerations should be thoroughly investigated before selecting plants for a site.



Technical Data

Any plant that will require unusual care should probably not be used, unless a life-time maintenance guarantee is provided by someone. Plants, in order to remain their healthiest, need occasional fertilizing, pruning, and watering; but if the plants are well-chosen for their location, they should require only routine maintenance.■



These pruned shrubs create textural interest, but need extensive maintenance.

Technical Data

Spacing of plants in a design largely will depend upon the plant's ultimate width or spread. If a massed or canopy effect is desired, the plants should be placed so their branches eventually intertwine or touch. If plants are intended to be seen separately, the plants should be spaced further apart. Remember—the effective shading, screening, or intended usefulness of a plant is highly dependent upon its present and projected size.

- The texture of a plant is determined by its foliage, bark, and branches. The fine feathering texture of a hemlock; the wirey, bristly texture of a barberry; or coarse voluptuous texture of a magnolia can visually change with viewing distance, weather conditions, or seasonal changes. By contrasting or complementing textures, interesting designs can be made. A plant's texture also should be considered when its use is intended for a screen, physical barrier, wind break, or other functional purpose.
- Color is one of the most delightful design tools available. Branches, leaves, flowers, and fruit are all sources of plant color in the landscape. A dramatic design tool because it is easily visible, color helps complement, accentuate, or soften an area. The startling white bark of a winter birch, the brilliant yellow leaves of an autumn maple, the shocking crimson flower of a spring crab, or the refreshing green foliage of a summer willow add seasonal interest to any landscape.

MAINTENANCE

The maintenance requirements of a plant should always be investigated. Plants that excessively litter the ground with fruit, seed pods, or thorny twigs should not be used in a main pedestrian circulation area. Not only are they messy, and demand much sweeping, but the plants are potentially dangerous for pedestrians who might slip on the debris.

It is preferable to use mature good-sized plants in a design. They initially cost more, but require less maintenance, are more vandal-resistant (because of their strength), and have an immediate effect on the landscape.

All these systems -- sidewalks, alleys, sitting areas, and recreational walks serve both functional and aesthetic purposes. When analyzed, both their uses and visual impacts should be considered. An attractive sitting area with nicely designed comfortable benches and large beautiful shade trees does not function well if it is located in an uninviting or inaccessible spot. Likewise a convenient and safe area may not be inviting without the pedestrian amenities that make it a comfortable place to congregate. Sidewalks, alleys, sitting areas, and other walks should be convenient, safe and comfortable as well as visually inviting, attractive, and pleasant.

SIDEWALKS

Sidewalks are the most efficient means of transporting foot-passengers through town. Located along the sides of roads, they give pedestrians direct access to major areas in town. Sidewalks provide the floor for pedestrian movement. They physically lead people from place to place and provide, along the way, a foundation for street lights, benches, signs, and landscaping.

The Main Street sidewalk is the central axis from which all minor sidewalks connect. Historically, Main Street was the first road built, around which all major homes, businesses, and institutions are located. It served as the main pedestrian and vehicular corridor to the village green, and the activity generated on Main Street, was the commercial and social backbone of the town.

Today Main Street remains the visual and functional focus of town. Banks, churches, town halls, libraries, retail stores, professional offices, and hotels vie for space on the busiest street in town.

Visually, Main Street molds a town's "image". It is often the only street seen by passing motorists. The design and condition of the buildings, storefronts, signs, and landscaping on Main Street relay an image or impression of the central business district. When people see poorly maintained buildings, confusing signs, unattractive window displays, and cluttered sidewalks with few pedestrian amenities, they feel it reflects the quality of merchandise or service offered within the center.

With the advent of the automobile came conflicts between the pedestrian and motorist. Initially, automobiles coexisted with streetcars, horse-drawn carriages, and pedestrians -- all shared the street. Pedestrian sidewalks were built of wooden planks, brick, or flagstone and placed under awnings and arcades.

When cars increased in numbers and started to dominate the streets they demanded certain privileges -- a lot of room for mobility, smoothly graded obstruction-free roads, sturdy bridges, and, eventually, street signs, traffic signals, light standards, parking spaces, and parking meters. Other utilities such as telephone poles, hydrants, mail boxes, and newsstands also demanded room. The existing streets often had to be widened to accommodate the growing number of cars and the additional space usually came from reducing sidewalk width, removing the planting strips, or placing all the utilities in the pedestrian zone. The "free space" for people on foot was reduced considerably.

Today many towns are trying to give that space back to the pedestrian, in an improved form. As more people walk into town from either their homes, a centralized parking lot, or a mass transit stop, town planners are realizing the need for comfortable, safe sidewalks connecting all areas of town. A town that offers a good selection of attractively presented merchandise, professional services, ample parking, and a beautiful well-maintained center with attractive buildings and signs also needs an accessible pedestrian circulation system.

THE SYSTEM

A "system" is defined as an organized body of connecting things or parts. A pedestrian system is, therefore, one specifically designed for pedestrians. A pedestrian circulation system for a town center should consist of sidewalks that run along the main street, along side streets, through parking lots and, if necessary, through private property. Alleys between existing buildings, sitting areas off of sidewalks, and recreational walks also should be part of the system.

Technical Data



Hudson, late 1800's



Hudson, present day



Neat, coordinated buildings and signs, landscaped sidewalks and generous pedestrian amenities demonstrate a feeling of pride amongst merchants and town officials. People, naturally, interpret and transfer this positive impression to the goods and services provided by the town. Because Main Street serves as the backbone of a business district's economy and vitality, the sidewalks along the street, and their image, should be given top priority in the design of a pedestrian circulation system.

Side streets connect with Main Street at oblique or perpendicular angles. Initially, the side streets were laid out for more functional than geometric reasons. The streets led to specific places, such as a mill, farm or grainery, and the most direct route determined the road's location. Today most side streets already are established and their functions vary. Many of these streets in the business district contain stores and offices, and residences are commonplace. Side streets are less visible from the main flow of traffic on Main Street and are less busy. Some are little-used. Construction and maintenance of these sidewalks often have been given low priority by town officials. The reduction of vehicular traffic on these streets offers excellent opportunities to widen sidewalks, provide landscaping or to create a pedestrian mall by closing a street on weekends or permanently.

Sidewalks within parking lots are very important. They provide safe and convenient access from lots to street sidewalks. People should be encouraged to use parking lots to take stress off of street parking. Parking lot sidewalks that are comfortable and conveniently linked to other pedestrian walks make parking lot use more attractive.

Private walkways are those which lead from private buildings to a public sidewalk. Although they are a minor part of a town's pedestrian circulation system, they should be considered in the overall design. They are often visually different from public sidewalks and are individually maintained. Occasionally a town can convince a private property owner to visually coordinate his walkway with the town's system.

Technical Data



Sidewalks convey a message.

Technical Data

ALLEYS

People naturally take the shortest possible route to get from one place to another, and openings between buildings give the pedestrian a perfect opportunity to "cut through" to another area. Main and side-street sidewalks form the basic pattern of the pedestrian circulation system, and alleys periodically punctuate it. Most pedestrian alleys are formed between existing buildings on Main Street and they usually lead to a parking lot or parallel street. The average distance a person will walk from a car to the central business district is approximately 300 feet. Pedestrian alleys minimize walking distances by providing short cuts to major areas in town. They also provide excellent potential to create unique pedestrian spaces with the addition of landscaping, benches, lighting, and graphics -- an opportunity to "pedestrianize" a town center.



Before



After

SITTING AREAS

A sitting area actually is any area where people can sit. People will sit on ledges, on rail fences, on curbs and on steps -- anywhere they comfortably can perch for several minutes of rest. Towns interested in comfortable pedestrian amenities should provide formally designated areas for sitting. Pedestrian sitting areas provide social gathering spaces for people, provide resting areas for the weary, and improve the image of a business district not only visually but psychologically by conveying the message "we care about our pedestrians."

Trees, benches, lights, and trash receptacles should be minimum requirements for a sitting area. A vacant lot, a recessed building, an alley, or an enlarged sidewalk all allow for the creation of these sitting areas. Size is less important than location. The key to success in locating a sitting area is visual accessibility. The area should be at eye level, directly off the beaten-path so that people walking by can see that seating is available, and those who are seated can enjoy watching the passersby.

RECREATIONAL WALKS

Walkways specifically designed for the sole purpose of recreation are called recreational walks. They might be used for a sprinting jog, roller skating, bicycling, or a leisurely stroll. They might run along a river, run along a brook, meander through a park or traverse conservation land. These walkways provide an opportunity to avoid conflicts with the automobile. One can go out and observe nature, get some needed exercise, or, at least, escape the bustle of shoppers, commuters, and general business life.

Technical Data



Trees, benches, lights, and trash cans should be the minimum requirements.



An attractive sitting area.

Technical Data



A comfortable sitting area with access for handicapped.

CONVENIENCE

All public pedestrian circulation systems must be convenient, not only for the average citizen, but also for the handicapped and impaired. The way to make sidewalks, alleys, sitting areas, and other walks convenient is to make them accessible -- physically connecting them when possible, and visually connecting them always. If a person arrived in town by car it would be convenient for them to have a sidewalk in the parking lot that was connected to Main Street by a pedestrian alley or sidestreet walk. If a person arrived in town by bus it would be convenient for them to have not only accessible sidewalks but a convenient sitting area to wait for the bus's return. A person who arrived by bicycle would appreciate a connecting recreation walk (complete with bicycle racks), and the arriving pedestrian would find all connecting systems most helpful. People should be able to walk easily from and to different areas of town without having to rely on dirt paths, unconnected sidewalks, dark alleys, streets, or paths through private property. If accessible safe and pleasant walks are available, people are certainly more apt to use a town center.

SAFETY

Connecting sidewalks and pedestrian areas must be safe. A safe pedestrian system is one that is physically separated from moving automobiles or similar hazards, is well-lit for evening use, and is designed to discourage accidents and crime.

Well-lit areas define walks, illuminate potential dangers, and discourage vandals. Areas that are open and visible, designed without hidden, obscure or screened areas discourage muggers, purse snatchers, or worse. Walks should be free of obstacles which might impair passage, and the walk surface should be smooth, even, and free of holes and chipped pavement that could cause tripping. The pavement material should not be slippery when wet, and special pavement consideration also must be given to the safety needs of the elderly and handicapped.

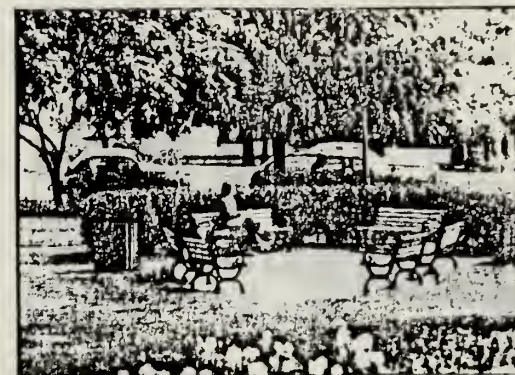
Walks should be physically separated from cars by elevation changes like curbs, or by distance, such as a planting strip or row of parked cars. A minimum curb height should be six inches, higher ones, such as the 18" curb installed in European towns, are even safer. There is no minimum separation distance -- the further the pedestrian is from the moving car the safer he or she is. A tree-planted strip or planters on the sidewalk provides adequate protection and is aesthetically pleasing, although a row of parked cars, while not very pretty, offers the greatest security.

PEDESTRIAN CROSSINGS

Careful analysis must be given to areas where the pedestrian system coincides with the vehicular system, as at intersections. Special consideration must be given to the pedestrian here. Over 10,000 deaths and hundreds of thousands of pedestrian maimings occur yearly in the United States, most of these occur at intersections where a pedestrian is crossing and a vehicle is turning in the same direction. It is for this reason that pedestrian crossings must be designed to aid the pedestrian across the street.

Direction lines can be drawn on the street pavement to direct the pedestrian to the most direct or safest crossing place. Statistics have shown that these cross-walks can cut in half the accidents involving mid-block jay-walkers. Although direction lines are not the safest or most effective system, they are economical, easy to install and maintain, and certainly better than nothing. The crossings may be either a series of perpendicular or diagonal lines, a solid area of cobblestones, or sections of exposed aggregate concrete. Crossings visually announce an area

Technical Data

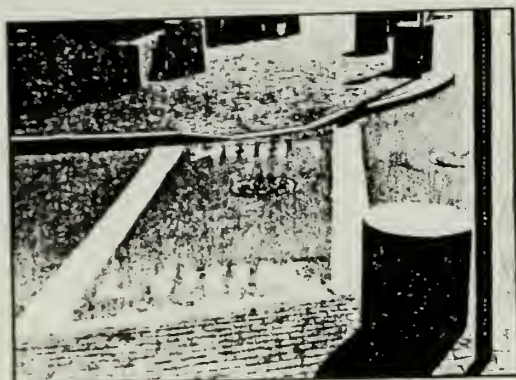


A sitting area should never be totally screened.

Technical Data



Inlaid cobblestone



Direction lines

and a textural difference also alerts a motorist that he or she is approaching a pedestrian zone. The inlaid materials do cost more than paint, but they are more attractive and longer lasting.

A pedestrian safe-cross is an extended area of a sidewalk, usually replacing a parking space. Located at an intersection or at midblock, these crosses increase pedestrian safety because they allow the pedestrian to better see the traffic flow and determine whether it is safe to cross. They also decrease the distance one must cross the street. Safe-crosses increase the visibility of pedestrians and cause drivers to slow down when approaching an intersection. In general, they are very effective on streets with low to average traffic volumes or commercial centers where traffic speed is slow. The construction of a safe-cross involves redesigning the existing intersection and realigning drainage structures, but the increased safety and comfort usually make them worthwhile.

A signalized intersection is much safer than either direction lines or safe-crosses, but should only be used when crossing pedestrians cause excessive traffic delay, visa versa, or when it is particularly hazardous to cross without a signal. Signalization is expensive and should be used only at major intersections that truly need them.

The scramble signalization system is the safest -- a method that stops cars in all directions, allowing the pedestrian to safely cross. The system is very inefficient for the motorist, however, so is not often recommended. A more popular system is a pedestrian-activated button which stops traffic in one direction after a slight time delay. Whatever system is chosen the timing should allow pedestrians to cross at least twice. This allows for the slower pace of the aged, young, and handicapped. An average pedestrian crossing the street delays traffic by seven seconds.

A tunnel or pedestrian bridge can be built to accommodate pedestrians, but this approach is only used in the most extreme conditions. Not only is the system expensive and complicated to build, but most pedestrians prefer an on-grade crossing and would attempt to use a more dangerous on-grade route instead of taking the extra steps to reach an elevated or tunneled crossing.

COMFORT

Safe, accessible sidewalks are a must and ones that are also comfortable make a system exceptional. A comfortable sidewalk system is wide enough to accommodate an average flow of pedestrians, giving them room to window shop, congregate, or pass one another. A comfortable walk provides shelter from the weather, intense sun, rain, snow, or wind. It provides places to sit and rest and is attractive and clean. Basically, a comfortable walkway system is one which makes the travelling experience a pleasant one.

WIDTH

The average shoulder width of a person is 18" but, allowing for clothing and psychological space, a normal human takes up 24" of sidewalk width. A comfortable sidewalk should allow for the passing of at least two people abreast; so a minimum sidewalk width of four feet is needed for people. An average of 18"-30" is needed for the meters, utility poles, mail boxes, etc. found on the outside curb of a sidewalk, and an additional 18"-30" is needed on the building side of the walk to accommodate opening doors, window shoppers', and general unused space. Therefore, given all the above standards, a minimum comfortable sidewalk width should be seven feet, and an even better width would allow for tree plantings and additional pedestrians.

Of course, not all town centers have the luxury of seven-foot sidewalks. If extra sidewalk width is needed to make an existing sidewalk more comfortable, several options are available. Occasionally, a sidewalk can expand into adjacent open land, either private or public. This is the easiest and least expensive option. If the sidewalk exists between a row of buildings and a street parking or travel lane, however, either the building or street must be moved to widen the sidewalk. Moving existing buildings is cost prohibitive, so the remaining options are to reduce or eliminate an existing on-street parking lane or travel lane.

Shortening a travel lane is possible only if the existing width is greater than needed, and eliminating a travel lane is sometimes possible if traffic circulation can be changed to a one-way system. Both these options, however, need considerable study to measure their effects on

Technical Data

the safety and flow of traffic. (See Section on Traffic and Parking.) If neither option is a viable solution, the elimination of some available on-street parking should be seriously considered.

Merchants almost unanimously demand parking in front of their stores, so the removal of on-street parking is usually unpopular. The removal of one on-street parking lane allows room for six feet of sidewalk expansion - divided between each side of the road or added all to one side. It is less work and expense to add the entire six feet to one side because the utilities and curbs only have to be relocated on one side. The needs, benefits, and costs must be carefully weighed. Determining which side should have parking removed can be a touchy decision. Pedestrian flow, traffic patterns, existing sidewalk widths, proximity to other parking spaces, and sun orientation are a few of the factors that must be considered in the analysis.

The construction of pedestrian safe-crosses is another way to supply additional room on a sidewalk. Only a few on-street parking spaces are taken (an average width for a safe-cross is six feet and the average length is 20 feet). And the benefits to the pedestrian are felt in a most important location. As people wait to cross a street, the additional space is very welcome and the safe-crosses often are landscaped for pedestrian comfort.

If no solutions are available to physically widen a sidewalk, other measures can be taken to make the existing walk more comfortable. Removal of unnecessary street clutter can free-up useable space in the 18"-30" utility zone. Signs can be consolidated onto one pole, parking meters can be combined, utilities can be placed underground, and mail boxes and newsstands can be moved back against the building. Additional space is freed for pedestrians.

Common sense also should dictate minimum width requirements for pedestrian alleys, sitting areas, and recreation walks. Alleys, already formed by existing buildings, should only add trees and benches if the remaining width allows for the passage of several people abreast, and entrance of emergency vehicles, if necessary. Sitting areas should have several benches and trees, but if available space only allows for a few, that is fine -- every little bit helps. A recreation walk, likewise, should be as wide as possible -- allowing for people with a normal walking speed and additional room for joggers, skaters, or bicyclists.

WEATHER PROTECTION

When analyzing a pedestrian circulation system for comfort, environmental factors should be considered. Available sunlight is one of the most appealing and influential factors for pedestrians. People love sun - in moderation. Sitting areas, sidewalks, and other pedestrian spaces with available sunshine are usually the most popular. By the same account, areas that are protected from disturbing winds or driving rain also are appealing. Nobody likes to sit or stand in a drafty, chilly, rainy, or extremely windy location, and everybody likes to feel protected from bad weather.

The impact of the sun, wind, rain, or snow on a pedestrian system is largely determined by the walk's orientation and its protection. The amount of available sunlight and the direction of the winds are often influenced by building heights and locations of other objects, like trees, that cast shade or deflect wind. A sitting area on the west side of the street should receive afternoon sun, but may be in shade if the neighboring building casts a shadow on it. An alley on the east side of the street should receive morning sun if balconies or other objects don't shade it. And long uninterrupted rows of buildings along a street might create a wind tunnel if side streets don't exist for cross-winds and multi-directional air movement.

Awnings on buildings and strategically placed trees produce shade, reduce wind speed, and provide partial cover from rain and snow. Covered "arcades" in alleys or along sidewalks provide continuous protection from the weather, and shelters placed on a recreation walk or at a bus stop provide invaluable comfort in bad weather. The availability of these protectors should be analyzed seriously within the context of a pedestrian circulation system.

Technical Data



Awnings provide cover.

Technical Data



People in constant motion.



A place to sit is welcome.

PEDESTRIAN AMENITIES

It appears as though people downtown are in constant motion. Destination-oriented pedestrians walk directly from point A to point B, window shoppers meander leisurely at a stroll, and motorists roll steadily by. But in the midst of this motion are those who have stopped temporarily. Some are resting from the walk -- such as the elderly, young, handicapped, or parcel-laden. Some are waiting for a ride or an appointment, and some are visiting with friends or business associates. And some people simply are enjoying the outside, absorbing the sun's rays, watching passersby, and collecting their thoughts.

Whether this passive activity takes place along Main Street, in an alley, or on a recreation walkway, a place to sit is always welcome. A place to toss trash is usually needed, and lighting is essential for evening comfort. Landscaping is a functional joy and miscellaneous pedestrian amenities such as umbrellas, kiosks, bicycle racks, and water-fountains always are appreciated.

SEATING

Benches, chairs, or planters best serve the purpose of outdoor seating. Seating obviously should be located directly off the pedestrian travel lane, in areas where people are most likely to congregate. Research has shown that people like to sit where pedestrian flow bisects a sitting space. They like to sit in spaces that can be either sunny or shady, and free from chilling or disturbing winds. They like to be able to choose to sit in groups, sit alone, sit near the flow of traffic, or away from it. In other words, people like spaces that allow them to choose their own physical and social setting.

- Portable chairs offer the most freedom of choice of all outside furniture. They can be picked up and moved to a sunny or shady location, or arranged in groups or individually. Depending on vandalism in the area, chairs can be left outside overnight, possibly chained, or moved inside. (A neighboring bank, restaurant, town hall, or local merchant might be responsible for maintaining the chairs.) And chairs work well in conjunction with tables. A large pedestrian area can be turned into an outdoor dining plaza with the

addition of a few tables, umbrellas, and chairs. Used for lunching or simple gathering, these spaces are always popular. Whenever possible, chairs should be placed throughout sitting areas in town.

Planters can serve the dual purpose of providing both landscaping and a place to sit. An attached sitting ledge or a wide top platform provides a long linear seating place comfortable for many people. An ideal sitting height is 17", but people can comfortably sit at a height range of one to three feet. The seat width, itself, should be a minimum of 18". Planters work particularly well in alleys where space is at a premium and where snow removal is not a problem.

Benches, whether prefabricated or custom-made for a site, are usually mounted permanently. For this reason their design and location should be considered carefully. The benches should be located in sitting spaces where chairs or planters are impractical. They may have backs and arm-rests or be simple, flat, backless platforms. Both styles have advantages. Backless benches allow great flexibility in seating -- one can sit facing any direction, and sprawl cross-legged over the sides, etc. On the other hand, the traditional backed and armed bench is more comfortable to sit on for long periods of time. The frequency, intensity, and purpose of use must be evaluated. Whatever design is chosen the benches should be generously sized to allow groups or individuals to sit comfortably.

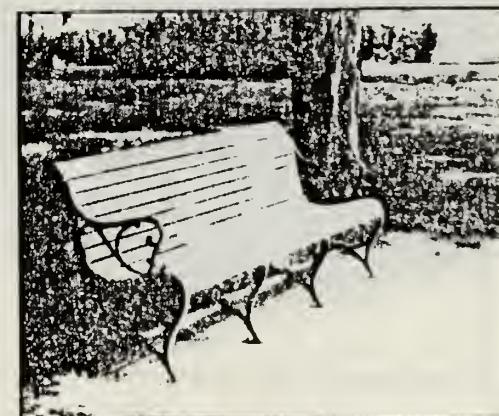
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Backless bench

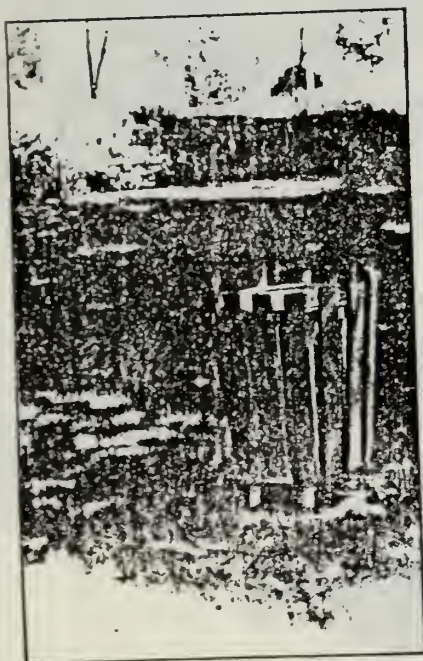


Planters serve for seating.



Historic-styled bench

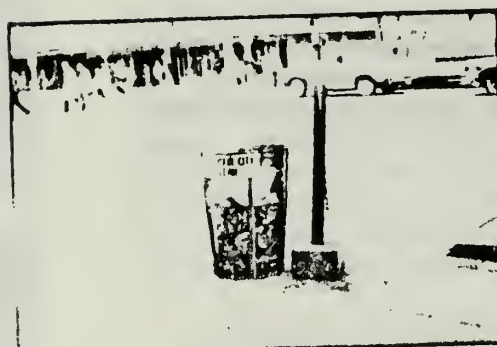
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TRASH RECEPTACLES

Trash containers should be located where needed. Their need can be easily determined by the amount of litter present. The presence of a trash receptacle does not guarantee that everyone will use it, but it does considerably reduce the litter problem. The receptacles should be placed in areas of high use and spaced frequently so people don't have to carry their trash a long distance. Care should be taken, however, not to overdo the number of available trash cans, for too many cans become cluttersome pieces of litter themselves. A receptacle can be mounted on an existing pole or placed on the ground. If portable, receptacles should not be so moveable as to be easily tipped. Permanent receptacles should have removeable liners for easy trash collection and, in all cases, the can should be large enough to comfortably accommodate all trash between collections.

Trash receptacles should be located close to sitting areas, but never directly next to a seat, for obvious foul-smelling reasons. Receptacles with lids keep odors and keep rain and animals out, but are less convenient to use. Location and design of the trash cans should be considered when analyzing pedestrian amenities.



Trash receptacles

LIGHTING

Lighting is both an art and a science. Towns must be lit to define forms in darkness, giving people safe access in car or on foot. But towns also can be lit to create an attractive town center at night. General lighting is used to illuminate surfaces, such as the street. Decorative lighting is used to accent an object or area to create visual interest. And amenity lighting is used both to define safe access and create attractive walks in the evening hours.

Types of lighting and styles of poles, fixtures, and bulbs are diverse, each having their own special properties. Tungsten bulbs give off a warm color with a random composition. Gas lamps give off a soft glow with limited lighting ability. Low-pressure sodium bulbs give off enormous amounts of light, but the orangish cast often is labeled unattractive. The lighting requirements for each area should be investigated carefully before choosing a particular bulb, and the style of fixture should complement the other pedestrian furniture and style of architecture.

Lights can be mounted on a pole, on a wall or in a bollard, depending on intended uses. Pole lights are very effective, if spaced properly, and can be quite attractive if an appropriate design is chosen. When sidewalk space is limited, wall lamps can be used. They are effective at night, if situated correctly, and are unobtrusive during the day. Mounting public lights on private buildings can sometimes cause maintenance and property conflicts, so consent of all building owners is essential. Bollard lights, being lower, usually are used for accenting sidewalks, and can create special affects.

Whatever type of lighting and style of fixture is needed, a lighting specialist should be consulted. In addition to the considerations of style and placement, many engineering decisions about intensity, location, and safety must be made.

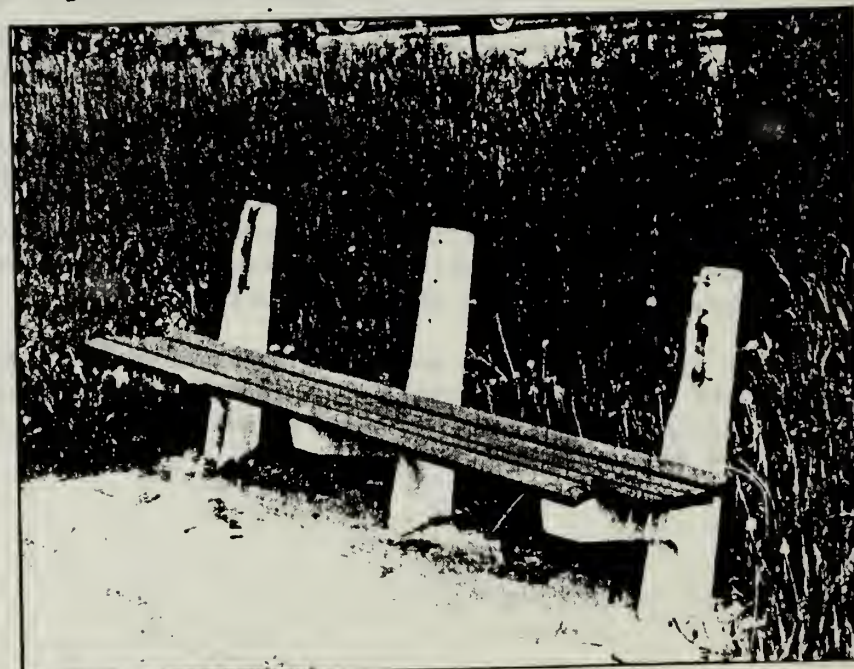
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VANDALISM AND MAINTENANCE

One of the surest ways to curtail the vandalism of pedestrian amenities is to use furniture (benches, trash receptacles, lighting, etc.) that is sturdy and will withstand normal use and abuse. A true vandal determined to destroy a piece of property will do so no matter what deterrents are used. But attractive, durable furniture in lit areas discourages the otherwise non-aggressive individual from vandalous acts. Furniture should not be flimsy and look easy to destroy, such as wicker chairs, and the furniture should not appear challenging to destruction such as a cement concrete block chair. Furniture also should not be hidden in private unpatrolled areas or areas that are unlit at night.

It has been found that an effective method of dealing with vandalism is to immediately repair or replace the vandalized item -- discouraging future destruction. For this reason it is often wise to use furniture that is fairly standard because stocked parts are easily found. Routine maintenance will be needed, regardless. An area or town center that appears well-kept and patrolled is less likely to attract vandals.■



Vandalism

Appendix



IMPLEMENTATION

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ED = Economic Development

T = Transportation, including traffic and parking

D = Design, including historic preservation

O = Other Public Works

1. COMMUNITY DEVELOPMENT BLOCK GRANTS - SMALL CITIES

State/EOCD

The Community Development Block Grant Program (CDBG) for small cities, formerly administered by the federal department of Housing and Urban Development, is now the responsibility of the state Executive Office of Communities and Development (EOCD). Eligible activities include property acquisition, improvement and disposition; rehabilitation loans, grants or interest writedowns; public infrastructure improvements to leverage private investment; business-development assistance; acquisition, construction, or rehabilitation of commercial or industrial facilities; and grant management and administration.

All Massachusetts communities under 50,000 population (except "entitlement" communities) are eligible to apply for one year or two year grants. Grants will range from a minimum of \$100,000 to a maximum of \$700,000 per year.

For further information contact:

The Division of Community Services
EOCD
100 Cambridge Street
Boston, MA 02202
(617) 727-7180

2. MASSACHUSETTS GOVERNMENT LAND BANK

State/Land Bank

The Government Land Bank is an independent state agency originally created to assist cities and towns in the conversion of closed military bases to civilian use. Legislation in 1980 granted the agency the authority to participate in a broader range of redevelopment projects including the revitalization of industrial, commercial and residential properties.

The criteria for Government Land Bank involvement include financial feasibility, public benefits, community support, and the leverage of private investment. The agency is currently empowered to take possession of, clear, improve and dispose of surplus federal and state property and blighted open property. The Land Bank does not

provide low interest loans per se, but rather acquires, improves and sells property at favorable terms. The agency can also help cities and towns with the technical analyses needed to determine the feasibility of a proposal.

The Land Bank works jointly with project sponsors to determine the eligibility of individual projects. The agency considers applications for both small and large industrial, commercial, residential and mixed-use developments.

For further information contact:

Mr. David Knisely
Director of Projects
Government Land Bank
6 Beacon Street, Suite 900
Boston, MA 02108
(617) 727-8257

3. COMMERCIAL AREA REVITALIZATION DISTRICT (CARD) PLANS
Local-State/EOCD

Commercial firms in approved revitalization districts are eligible for tax-exempt revenue bond financing, mortgage insurance, and state tax-credits in high-property-tax communities. In addition, communities with approved districts are eligible to apply for funds under the state's Off-Street Parking Program and Chapter 557 Economic Benefit Sewer program.

To be eligible for these programs, the commercial activity must be located in an approved Commercial Area Revitalization District (CARD), typically an older downtown area. CARD plans are developed by the community and submitted to the Executive Office of Communities and Development (EOCD) for review and approval. To qualify, the area must be an older, established commercial area experiencing (or threatened by) physical decay. EOCD has published guidelines on how to prepare a CARD plan, and has staff available to assist cities and towns in the process.

All communities in Massachusetts are eligible to develop CARD plans.
To qualify, the district must be an older, established commercial area.

For further information contact:

Mr. Ed Mangini, Administrator
Executive Office of Communities and Development
Room 904
100 Cambridge Street
Boston, MA 02202
(617) 727-7180

4. NEGOTIATED TAX AGREEMENTS: CHAPTER 121-A
Local-State/EOCD

This Massachusetts General Law enables communities to attract private development to blighted, substandard, or decaying areas through the negotiation of a tax agreement for a term of up to 40 years. The community, in deciding to negotiate this type of agreement, must determine if the development will make a long-term contribution to the community deserving a tax agreement.

The procedure for negotiating this agreement requires the Executive Office of Communities and Development (except in Boston) to approve the application for the proposed development. The procedures for the application and approval process are spelled out in a publication, entitled Chapter 121-A: A Handbook for Local Officials.

Usually a single purpose corporation is formed to utilize Chapter 121-A. Partnerships, joint-venture corporations, non-profit corporations, insurance companies, saving cooperatives and bank consortiums are eligible to apply for this agreement.

For further information contact:

Ms. Arlene Browne
Executive Office of Communities and Development
Room 903
100 Cambridge Street
Boston, MA 02202
(617) 727-7180

5. LEEWAY LAW
State/Banking Department

The so-called "Leeway-Law" was enacted by the Massachusetts Legislature in 1970 to enable both savings banks and cooperative banks to directly invest in development projects (or business ventures) they would not otherwise be authorized to invest in. Banks seeking ways to display their commitment to the communities they serve can take the initiative in community revitalization efforts by participating directly in development plans. The Leeway Law provides a great deal of freedom to banks to play a number of roles in the development process. Banks can provide the equity as well as the financing needed to get a project moving.

Working usually through a solely owned subsidiary, a bank can purchase, develop, and manage property. The size of a bank's leeway investments are limited to a maximum percent of total deposits on any single investment.

For further information contact:

Mr. Edward F. Flynn, Jr.
Deputy Commissioner of the Banking Department
20th Floor
100 Cambridge Street
Boston, MA 02202
(617) 727-3139

6. STATE URBAN RENEWAL: CHAPTER 121-B
State/EOCD

The Executive Office of Communities and Development (EOCD) is responsible for approving all renewal plans, as submitted by local redevelopment authorities. These plans are primarily used to package development proposals, especially when private land is being acquired for transfer to a private entity for some public purpose. In the past, some funding has been provided for planning assistance grants for economic development. A local Redevelopment Authority or Housing Authority is the entity which submits these plans.

For further information contact:

Mr. John Young
Division of Community Services
Executive Office of Communities and Development
Room 903
100 Cambridge Street
Boston, MA 02202
(617) 727-3197

7. COMMUNITY DEVELOPMENT ACTION GRANT (CDAG) PROGRAM
State/EOCD

The Massachusetts Community Development Action Grant program was signed into law in 1982. (Final rules and regulations are still being reviewed by the Legislature.) The purpose of the program is to provide financial support for projects aimed at attracting and leveraging private investment, creating new employment opportunities, and revitalizing distressed areas.

The program will be administered by the Executive Office of Communities and Development (EOCD) and will be open to all cities and towns throughout the state. Program requirements include that the project area be blighted, that the project will be of public benefit and would not occur by private enterprise alone, and that the project will have significant impact on the economic condition.

For further information contact:

Mr. John Loehr
EOCD
100 Cambridge Street
Boston, MA 02202
(617) 727-7130

8. URBAN DEVELOPMENT ACTION GRANTS
Federal/HUD

This program encourages private investment and development in distressed urban areas, through the leveraging of private funds with federal funds. The federal funds can be used to provide direct loan assistance to the developer or they can be used to finance public construction to facilitate private efforts.

The program is limited to communities that meet HUD's "distress" criteria. Activities eligible for funding can be virtually any component of a development program that is tied to a private commitment. Typically, HUD looks for projects which "leverage" private commitments equal to at least five or six times the public investment.

The determination of eligibility is made by HUD based on a set of "distress" criteria that measure such factors as age of housing, unemployment, and population decline.

For further information contact:

Mr. Robert L. Paquin, Director
Community Planning and Development Division
Boston Area Office
U.S. Department of Housing and Urban Development
15 New Chardon Street
Boston, MA 02114
(617) 223-4114

9. SMALL BUSINESS ADMINISTRATION (SBA): SECTION 7A
Federal-Local/SBA

Loan Guarantees and Loan Programs.

The SBA aids small businesses that are unable to obtain conventional financing. Direct loans and loan guarantees may be used for business construction, expansion, or conversion of facilities and to purchase building materials or equipment.

Direct loans, which are currently being discouraged by the SBA, are available at below the prime rate. The maximum loan amount is \$150,000.

Guaranteed loans are insured for up to 90 percent, for loan amounts of up to \$500,000. Guarantees allow businesses to negotiate for a lower than usual rate with local banks.

For further information contact:

Your local bank or
Doris McCarthy
SBA
150 Causeway Street
Boston, MA 02114
(617) 223-3224

10. REVOLVING LOAN FUNDS

Local

Any bank that regularly provides credit is operating a revolving loan fund. All "revolving" means is that when loans are repaid, the money returns to a pool of available funds to be lent out to someone else. The basic reason for a revolving loan fund is to reduce the bank's risk enough to persuade bank loan administrators to participate in the financing they may not make ordinarily.

Loan funds set up by organizations for this purpose come in two forms: direct and guarantee. With a direct loan fund, the organization extends a portion of the total loan needed by the business. Normally the group takes a subordinated position to the bank, which means that in case of default the bank has priority in recovering its losses from sale of the firm's assets.

Loan guarantee programs work somewhat differently. Instead of actually making part of the loan, the guarantor agrees to insure the bank against some percentage of losses. Organizations that operate guarantee funds usually deposit the amount they are insuring at the bank during the term of the loan. This "compensating balance" insures to the bank that the monies are indeed available to guarantee its loan. It also provides a bonus for the bank: additional funds it

can loan to other customers during the life of the revolving loan guarantee.

For further information contact:

The Massachusetts Community Economic Development
Assistance Corporation
27 School Street
Boston, MA 02108
(617) 727-0506

11. ECONOMIC DEVELOPMENT ADMINISTRATION
Federal/EDA

The Economic Development Administration (EDA) has a variety of programs aimed at encouraging economic development including public works programs, business loans, and economic planning grants. The new EDA program regulations and funding levels are pending and seem likely to change. Four of the major existing programs are described below:

Title I Public Works and Development Facilities: States, municipalities, special authorities, and public or private non-profit organizations are eligible to apply for grants for the acquisition, development, or expansion of public works facilities. Included are: water and sewer systems, site improvements for industrial parks, factories and port facilities. These funds cannot be used for the acquisition of land. In order to apply for grants, an area must have an approved Overall Economic Development Program (OEDP) on file with EDA.

Title II Business Development Loans: Any public or private entity including non-profit and for-profit corporations, sole proprietorships and partnerships are eligible to apply for direct loans, to be used for the acquisition of fixed assets (land, building, equipment, machinery); land preparation; building rehabilitation; and working capital for industrial or commercial enterprises. Interest rates are based on the current U.S. Treasury borrowing rates.

All loans must be consistent with the area's Overall Economic Development Program and be approved by a state or local economic development agency.

Title III Economic Development Planning Grants: Government entities and organizations engaged in planning economic development activities can apply for direct grants to fund planning, staffing and administrative expenses related to economic development planning projects. A 25 percent non-federal match is required. Grants are for one year and are ordinarily renewed.

Supplemental and Basic Grants Program (Section 304): The 304 program provides states (which must provide a 25 percent match) with monies to initiate and enhance eligible economic development projects. The type of eligible projects include: grants for public works and development facilities; business and industrial loans and loan guarantees; grants for technical assistance, research, and economic development planning; and grants for special economic development and adjustment assistance. Projects must conform to the state's economic development goals and policies.

For further information contact:

Mr. William Fitzhenry
Economic Development Administration
441 Stuart Street
Boston, MA 02116
(617) 223-6468

12. FARMERS HOME ADMINISTRATION
Federal/FmHA

The Farmers Home Administration (FmHA) administers several programs directed toward economic development in "rural" areas. Many of Massachusetts' older centers (particularly in Western Massachusetts) qualify as "rural."

Business and Industrial Loans: Public, private or cooperative organizations, or individuals in rural areas are eligible to apply for guaranteed loans (up to 90 percent of principal and interest). Loans may be used for: business and industrial acquisitions; construction; repair; modernization; purchase of land; machinery and equipment; furniture and fixtures; start-up and working capital;

13. processing and marketing facilities; and pollution control. Interest rates, consistent with market rates, are determined between the borrower and a private lender. Loans are repayable over 30 years on land, buildings and permanent fixtures; 15 years on machinery and equipment; seven years on working capital. A 10 percent to 30 percent equity investment may be required. Generally the minimum loan size is \$500,000.

Community Facility Loans: Public agencies, as well as non-profit corporations, are eligible to apply for loans to construct or improve community facilities which provide essential services to rural residents. Towns and special purpose districts of 10,000 population or less are eligible. Facilities which provide residents with safety and protection (such as fire stations and hospitals) are given first priority. Large loans are discouraged. The interest rate on these loans fluctuates every quarter and is based on the prime rate.

Water and Waste Disposal Loans and Grants: Municipalities, counties, special purpose districts, and non-profit corporations are eligible for funds to improve water and waste disposal facilities. Preference is given to areas with less than 5,500 people. The interest rate on these loans fluctuate and is based on the prime rate.

For further information contact:

Farmers Home Administration
Massachusetts State Office
451 West Street
Amherst, MA 01002
(413) 253-3471

14.

13. MASSACHUSETTS COMMUNITY ECONOMIC DEVELOPMENT ASSISTANCE CORPORATION
State/CEDAC

CEDAC is a quasi-public agency that promotes the participation of community-based non-profit organizations, such as community development corporations, in the process of developing economically depressed neighborhoods and communities. CEDAC is able to provide technical assistance that involves a broad range of expertise including:

1. organizational development
2. financial planning and packaging
3. market research
4. management training
5. legal advice
6. grantsmanship advice

For further information on CEDAC, contact:

Massachusetts Community Economic
Development Assistance Corporation
27 School Street, Suite 500
Boston, Massachusetts 02108
(617) 727-0506

14. MASSACHUSETTS SMALL BUSINESS DEVELOPMENT CENTER
State/MSBDC

The MSBDC is a program funded by the U.S. Small Business Administration and the Massachusetts Department of Commerce and Development to provide comprehensive small business management and technical assistance to the small business community. The MSBDC provides business counseling, marketing research, business planning and financial analysis through professional counselors who have access to the resources of participating universities and colleges as well as the expertise of specialized consultants. The MSBDC also provides long-term courses and one-day workshops on subject areas of interest to the small business person or prospective small business owners.

16.

The MSBDC is coordinated from a central unit at the University of Massachusetts Center for Economic Development in Amherst. Presently there are two regional service centers. The Western Massachusetts SBDC is located in Springfield and services small businesses in Berkshire, Hampden, Hampshire and Franklin counties. The Metro Boston SBDC is situated in Chestnut Hill, adjacent to the Boston College Campus. In addition, three new centers are in the planning stages for central, northeastern and southeastern Massachusetts.

For further information and assistance, contact:

Small Business Development Center
School of Business Administration
University of Massachusetts
Amherst, Massachusetts 01003
(413) 549-4930, Extension 303

15. MASSACHUSETTS INDUSTRIAL FINANCE AGENCY
State/MIFA

The Massachusetts Industrial Finance Agency (MIFA) is an independent state agency designed to promote employment growth through incentives that stimulate business investment in Massachusetts. MIFA's incentives for industrial companies include industrial revenue bonds, loan guarantees, and pollution control bonds.

MIFA financing is available for commercial real estate if these projects are located in locally designated Commercial Area Revitalization Districts (CARD). CARD areas primarily encompass older downtown areas.

For further information on MIFA, contact:

Robert E. Patterson, Executive Director
Massachusetts Industrial Finance Agency
125 Pearl Street
Boston, Massachusetts 02109
(617) 451-2477

6. URBAN JOB INCENTIVE
State/EOEA

The Urban Job Incentive is a dual tax incentive designed to induce corporations to establish new places of business in primarily urban municipalities. This locational incentive program effectively reduces the equalized local property tax rate to the state's equalized average as it applies to an eligible corporation, while also providing for a 25% payroll deduction.

The Urban Job Incentive works in two ways:

1. A company may claim a credit against its state excise tax liability. The amount of the credit equals the difference between a city's tax rate and the state's average times the assessed value of the property per thousand. In some cities, this credit over a 10-year period could equal or exceed the cost of property itself.
2. Companies locating in an eligible area can also deduct from their revenues 25% more than actually paid in compensation to those employees who live in an "eligible section of substantial poverty." This 25% is in addition to the 100% normally allowable for a deduction. Attached are lists of eligible cities and towns. (Please note that the list of eligible areas will change once the income statistics from the 1980 census are made available.)

Industrial enterprises locating in an eligible area and commercial enterprises locating in commercial area revitalization districts (C.A.R.D.) within an eligible area all alike for the Urban Job Incentive. The facility may be either a new place of business or a substantial addition to an existing place of business, but not a replacement facility. The facility must employ at least 20% of its employees from the "eligible section of substantial poverty" in which it is located. In addition, the participating corporation must offer a training program which provides for job upgrading and entry into supervisory positions.

For further information, contact:

Urban Job Incentive Bureau
Executive Office of Economic Affairs
One Ashburton Place, Room 2101
Boston, Massachusetts 02108
(617) 727-8380

17. INDUSTRIAL REVENUE BONDS
State/Local

An industrial revenue bond is a low interest, tax-exempt bond issued through a state agency or a municipality on behalf of private enterprises. It is used to finance industrial expansion projects such as plant and equipment loans. What the bond effectively does is lower the rate of interest on a capital expenditure loan to about three-fourths of the prime lending rate (this varies from case to case). The credit of this bond is that of the company, and not of the issuing authority, the state, or the municipality.

Revenue bonds are available for commercial enterprises but only in designated Commercial Area Revitalization Districts (CARDs). A CARD is set up by a community (with the approval of the state) in order to bring about the revitalization of central business districts, usually encompassing downtown areas.

The bonds are issued either by the local Industrial Development Financing Authority (IDFA) in a particular municipality with MIFA's approval, or, in communities without IDFA's, by MIFA itself.

For further information on revenue bonds contact:

Massachusetts Industrial Finance Agency
125 Pearl Street
Boston, Massachusetts 02215
(617) 451-2477

18. MASSACHUSETTS FOUNDATION
Private

The purpose of the Massachusetts Foundation is to provide permanent mortgage money to developers and industrial concerns building new facilities within Massachusetts. The Foundation is an organization of pension funds used for financing new union construction in Massachusetts. Only real estate projects over \$1 million are eligible for funding.

For further information, contact:

Richard Kronish
Professor of Labor Studies
University of Massachusetts
Boston, Massachusetts 02127
(617) 287-1900 X 2800

19. MASSACHUSETTS BUSINESS DEVELOPMENT CORPORATION
State/MBDC

The Massachusetts Business Development Corporation (MBDC) provides loans for businesses who cannot obtain all of their financial requirements from conventional sources. Many small or medium-sized business enterprises are eligible for financing.

MBDC makes six types of loans:

1. Working capital-secured by fixed assets.
2. Leveraged buy-outs when a significant loss of jobs from the Commonwealth is at stake.
3. Second mortgages-conventional or with an industrial revenue bond for plant expansion or new production facilities.
4. Government guaranteed loans-various programs: SBA, Farmers Home Administration.
5. SBA 503 loans.
6. Long-term loans for new equipment or energy conversion.

While MBDC often participates with conventional lenders in a financial package plan, it can provide up to 100% financing. Loans are medium to long-term. The advantages to businesses of borrowing from MBDC include:

1. MBDC accepts collateral which normally is not acceptable to conventional lenders;
2. MBDC provides guidance and expertise for businesses seeking financing.

For further information on MBDC, contact:

Massachusetts Business Development Corporation
One Boston Place
Boston, Massachusetts 02108
(617) 723-7515

20. MASSACHUSETTS COMMUNITY DEVELOPMENT FINANCE CORPORATION
State/CDFC

CDFC provides capital to entrepreneurs unable to secure financing through conventional funding sources. CDFC's investments must be made in conjunction with community development corporations (CDC's). (CDC's exist in many economically depressed neighborhoods throughout Massachusetts.) Emphasis is on developing sound businesses which will create or retain good-paying jobs and provide other economic benefits to residents in communities served by CDC's.

Investments are made by CDFC from a \$10 million fund provided by the Commonwealth. These investments may take the form of loans and/or equity. The rates and terms of each investment are negotiable.

Entrepreneurs wishing to apply should contact CDFC to see if a CDC exists or is being created in their area and whether that area is eligible under CDFC guidelines. A full business plan can then be prepared.

It is important that entrepreneurs have explored conventional sources of financing prior to approaching CDFC with a business proposal.

For further information on CDFC, contact:

Massachusetts Community Development
Finance Corporation (CDFC)
131 State Street
Suite 600
Boston, Massachusetts 02109
(617) 742-0366

21. ECONOMIC RECOVERY TAX ACT OF 1981
Federal

An Investment Tax Credit (ITC) is a credit that may be deducted from the amount of the taxes owed. Under the Economic Recovery Tax Act of 1981 (ERTA), and ITC for qualified rehabilitation is as follows:
15 percent for non-residential structures at least 30 years old;
20 percent for non-residential structures at least 40 years old; and
25 percent for certified historic structures, residential or non-residential.

A "qualified rehabilitation" refers to any building that has been substantially rehabilitated, that is, rehabilitation expenditures exceeding the greater of either the taxpayer's adjusted basis in the property or \$5,000 within a 24-month period. The building also must have been in use prior to beginning the rehabilitation and retain at least 75 percent of the existing external walls.

For further information contact:

The National Trust for Historic Preservation
45 School Street
Boston, MA 02108
(617) 223-7754

22. HISTORIC PRESERVATION INCENTIVES
Federal-State/MHC

There are two major federal programs aimed at encouraging the preservation and rehabilitation of historic buildings; both are administered by the Massachusetts Historical Commission (MHC).

National Register Grant-in-Aid Program: The Federal Heritage Conservation and Recreation Service provides funds for matching grants of up to 50% of costs to property owners who buy and/or develop properties listed in the National Register of Historic Places. Funds can also be used for survey and planning projects related to historic resources.

Tax Act Certifications: Owners of income-producing National Register properties (including rental housing units) can receive tax incentives for rehabilitation work - either amortizing their costs over a five-year period, taking accelerated depreciation over five years, or receiving an investment tax credit of 25 percent, 15 percent or 10 percent depending on the age and historic/architectural significance of the structure.

The MHC reviews and approves all proposed rehabilitation work before the Heritage Conservation and Recreation Service receives the plans for final approval and certification for tax purposes. Owners and buyers of properties listed in the National Register of Historic Places are eligible to apply.

For further information contact:

Ms. Candace Jenkins
(National Register Grant-in-Aid
Mr. Joseph Orfant
(Tax Act Certifications)
Massachusetts Historical Commission
294 Washington Street
Boston, MA 02108
(617) 727-8470

23. LOCAL HISTORIC DISTRICT

Local/Massachusetts Local Historic District Association

The purpose of an historic district is to give historical or architectural significance, and to encourage new designs that are compatible with the existing buildings. A local historic-district commission reviews proposed exterior changes to buildings or applications for new construction and rules on the appropriateness of the proposal. There are no provisions in local historic districts for financial support for rehabilitation, nor is there necessarily any protection from adverse effects of federal programs, but if the local district is certified by the Secretary of the Interior as meeting National

Register criteria, the local district may be eligible for tax benefits.

For further information contact:

Dave Nazaroff
Massachusetts Local Historic District Association
265 Hale Street
Beverly, MA 01915
(617) 922-4562

24. URBAN SYSTEMS ROADWAY IMPROVEMENTS *

Federal-State/DOT-DPW

Funding under the Urban Systems program can be used for improvements to existing roadway systems. Eligible activities include reconstruction, removal of on-street parking, realignment, sidewalk improvements, street lighting, and tree planting along improved roadways. Monies can also be used to pay for the replacement of spaces lost through the removal of on-street parking in an Urban Systems project or through some other federally funded street improvement program.

Seventy percent of the cost of these projects is paid by the federal government and the remaining 30 percent by the state. In order for a community to move its project along expeditiously, it must use local funds to produce designs which can be approved at the state level for construction financing. Most municipalities are eligible to apply.

For further information contact:

Mr. Sumner Hoffman
Urban Systems Coordinator
100 Nashua Street
Room 804
Boston, MA 02114
(617) 727-9400

25. OFF-STREET PARKING PROGRAM

State/Administration and Finance

The Executive Office of Administration and Finance administers the Off-Street Parking Program. This program is designed to assist cities and towns in financing the construction of public off-street parking facilities in Commercial Area Revitalization Districts (CARDS). It provides grants on a 70 percent state/30 percent local matching fund basis.

*Note: for this and other transportation funding programs, please see the companion manual on these programs available through the MAPC.

27.
Communities with a population of over 20,000 or those with commercial facilities for a regional market area are eligible to apply for funds for an approved CARD district.

For further information contact:

Mr. Paul Mahoney
General Counsel
Executive Office of Administration and Finance
Room 271M
State House
Boston, MA 02133
(617) 727-2070

26. PUBLIC WORKS ECONOMIC DEVELOPMENT PROGRAM
State/EOTC

Under this program, the Executive Office of Transportation and Construction (EOTC) is responsible for funding the design and construction of roads and other related public works facilities needed to stimulate local economic development. Eligible activities include projects for the design, construction and/or reconstruction of public access roads, bridges, curbing, sidewalks, lighting systems, traffic control facilities, and drainage systems associated with municipal economic development. Grants are provided for 100 percent of project cost. All Massachusetts communities are eligible to apply.

For further information contact:

Mr. Patrick Moynihan or Steven Edelstein
Executive Office of Transportation and Construction
1 Ashburton Place
Boston, MA 02108
(617) 727-7680 or 727-2373

27. STATE AID DISTRIBUTION TO MUNICIPALITIES

State-local/MDPW

State aid to municipalities for highway purposes is provided by the Massachusetts motor fuel tax. The tax is 10 percent of the wholesale selling price of each gallon of gasoline. The Commonwealth reserves 15 percent of the tax for distribution to municipalities in two ways: one half under the "cherry sheet" (the colloquial name for the form used by the State to list estimated receipts and charges for community fund transfers) and one half to "Chapter 90" improvements, as described below.

STATE AID-CHERRY SHEET DISTRIBUTIONS. Highway-related aid on the "cherry sheet" is reimbursement to the community for the cost it incurs in constructing, maintaining, and policing its roads. In order to receive these funds, the chief local elected official must certify to the Massachusetts Department of Public Works (MDPW) that costs have been appropriated for these items by the municipality. The amount which your community receives in allocation is determined from information collected by the MDPW.

STATE AID - CHAPTER 90. These funds may be used for "construction, reconstruction, and improvements on all approved public ways which qualify under the State Aid Highway guidelines. Improvements can include resurfacing, preliminary engineering, right-of-way acquisition, shoulders, side road approaches, landscaping and tree planting, road-side drainage, structures, sidewalks, traffic control and service facilities, street lighting and surface treatments.

Payments of "Chapter 90" funds are 100 percent or 75 percent reimbursements to the community for costs which have been specifically approved by the MDPW in advance.

For further information contact:

Mr. Thomas Queenan
State Aid to Cities and Towns
MDPW
100 Nashua Street
Boston, MA 02114
(617) 727-4775

28. SELF-HELP CONSERVATION GRANT PROGRAM
State/EOEA

This program, administered by Executive Office of Environmental Affairs (EOEA), Division of Conservation Services, assists municipalities in acquiring land for conservation and passive recreation purposes. It provides for the 80 percent reimbursement of funds actually expended by a municipality to acquire land for conservation or passive recreation. Any development costs must be absorbed by the municipality. The Conservation Commission of a municipality is the eligible applicant for the program.

The Urban Self-Help Grant Program, administered by the Parks and Recreation Department of EOEA, provides similar funding for municipalities with a population of over 35,000.

For further information contact:

Mr. Joel Lerner, Director
Division of Conservation Services
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, MA 02202
(617) 727-1552

29. REPAIR AND REHABILITATION OF WATER SYSTEMS: CHAPTER 805
State/EOEA

This program will provide \$10 million in 50 percent matching grants to communities and water districts, five percent of which will go toward leak detection programs, the remaining 95 percent for the rehab or replacement of water mains, laterals and associated distribution elements. In addition only five percent or \$500,000 can go to any one community or district. The Department of Environmental Quality Engineering has established criteria for receipt of grants which include a community's unaccounted for water usage, the institution of an ongoing leak detection program, water

pressure for fire protection, and the institution of a comprehensive water resources management program. All Massachusetts communities and water districts are eligible to apply.

For further information contact:

Thomas Doucette
Department of Environmental Quality Engineering
1 Winter Street
Boston, MA 02108
(617) 292-5500

30. SEWER COLLECTION SYSTEM GRANTS: CHAPTER 557
State/DWPC

This program provides funds to construct sewer systems for which federal aid is not available. Grants are to be made in an amount not to exceed 40 percent of the eligible construction cost or \$1 million, whichever is less. Grants are made in accordance with a priority system established under Division of Water Pollution Control regulations.

With respect to economic benefit projects, only projects that assist in creating or retaining long-term employment opportunities will be considered for funding. Any Massachusetts city or town is eligible to apply.

For further information contact:

Mr. Thomas McMahon
Director of Water Pollution Control
1 Winter Street
Boston, MA 02108
(617) 727-3855

Mr. John Loehr (Economic Benefit Programs)
EOCD
100 Cambridge Street
Boston, MA 02202
(617) 727-7130

31. SEWAGE TREATMENT CONSTRUCTION GRANTS: SECTION 201
Federal - State/EPA-DWPC

This program provides federal and state funding on a matching basis for planning, design, and construction of sewers and for sewage treatment plants. The State Division of Water Pollution Control administers the "201" program. Under the terms of the program, the Environmental Protection Agency pays for 75 percent of project cost, and state and local government share the remainder on a 15 percent-10 percent basis.

All Massachusetts cities and towns are eligible for the "201" program.

For further information contact:

Mr. Thomas McMahon, Director
Division of Water Pollution Control
1 Winter Street
Boston, MA 02108
(617) 727-3855

MARKETING

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1215 EAST 58TH STREET
CHICAGO, ILL. 60637
U.S.A.

THE CONSUMER PRICE INDEX*

The Consumer Price Index (CPI) measures the price change of retail goods and services over time. It compares the cost of a market basket of goods and services this month with its cost a month ago, or a year ago, or 10 years ago. The point in time to which the prices are compared is called the base period. The base period for the current index is 1967. For example, say that in 1967 the prescribed market basket could have been purchased for \$100. In June 1977 the CPI was 181.8. That would mean that the same combination of goods and services that cost \$100 in 1967 cost \$181.80 in June 1977.

The CPI has three uses-as an indicator of inflation, a deflator of other indexes, and as an escalator. In market studies it is mostly used to adjust indexes like retail sales and personal consumption expenditures for price changes. Translating these indexes into inflation-free dollars allows the analyst to compare sales and expenditure figures over time. Below is methodology for doing this.

METHODOLOGY

1. Contact the Massachusetts Department of Labor (223-6761) for current CPI information. Statistics are compiled quarterly and averaged for each year. The yearly average generally is used to compute inflation rates.
2. From the most recent year available, subtract the reference year CPI to find the difference between those two years (the change).
3. Divide the difference by the CPI reference year and multiply the result by 100 to find the rate of inflation between those two years.
4. To adjust a reference-year sales or expenditure figure for inflation, (to translate it to current dollars) multiply it by the rate of inflation. Add that number to the reference year figure. The result is the adjusted figure.

*Consumer Price Index information and definitions from: The Consumer Price Index: Concepts and Content Over the Years, U.S. Department of Labor, Bureau of Labor Statistics, Report #517, May 1978.

THE CONSUMER PRICE INDEX (Continued)

EXAMPLE

$$\begin{array}{r} 266.6 \\ - 183.4 \\ \hline 83.2 \end{array}$$

Current Year CPI (1981)
Reference Year CPI (1977)
Difference

$$\begin{array}{r} 83.2 \\ \div 183.4 \\ \hline 0.4536 \end{array}$$

Difference
Reference Year CPI
Result

$$\begin{array}{r} \times 100 \\ \hline 45.36\% \end{array}$$

Rate of Inflation Between 1981 and 1977

$$\begin{array}{r} \$ 6,272 \\ \times 45.36\% \\ \hline \$ 2,845 \\ + 6,272 \\ \hline \$ 9,117 \end{array}$$

1977 Per-Capita-Income, Beverly (Reference Year)
Rate of Inflation
Increase
1977 Per-Capita-Income (Reference Year)
1977 Per-Capita-Income in Current Year \$

SAMPLE BUSINESS SURVEY LETTER

Clifftondale Merchants Association

P. O. BOX 1191

SAUGUS, MASSACHUSETTS 01906

August 25, 1981

Dear Clifftondale Square Businessperson:

A Revitalization Study is underway in Clifftondale Square. The goal of this project is to improve the Square both as a place to do business and as a focal point of the community. The project is being conducted by the Town of Saugus in conjunction with the Clifftondale Square Merchants Association and the Metropolitan Area Planning Council (MAPC). The study is being funded by a grant from MAPC and a contribution from the Clifftondale Square Merchants Association.

In order to make the most of this opportunity to plan for the future of the Square we need to learn more about how it functions today. As part of our study, we are asking you to take a few minutes to fill out the attached questionnaire. The answers will help us find realistic solutions to parking, traffic, and marketing problems in the Square.

If in answering any of these questions you do not have specific information available, your own best estimate will be fine. All responses will be kept confidential and findings will be grouped by broad retail categories in the final report.

Please mail these questionnaires back to MAPC by September 4, 1981. If you have any questions you may call me at 233-0300, or Agnes Baker, MAPC Project Manager at 451-2770.

Thank you for your cooperation in this project.

Sincerely,



Paul Ciccarella, Chairman
Clifftondale Square
Revitalization Committee



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CHICAGO
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SAMPLE

RETAIL BUSINESS SURVEY

1a. What type of business do you operate? (Examples: Men's clothing, gift shop, restaurant, etc.) _____

b. Is your business :

☐ Independent ☐ Regional ☐ Local Chain ☐ National Chain

c. What are your business hours?

Mon. _____ Tues. _____ Wed. _____ Thurs. _____ Fri. _____ Sat. _____ Sun. _____

2. How long has your business been located in downtown Woburn?

☐ Less than 2 years ☐ 10-20 years
☐ 2-5 years ☐ Over 20 years
☐ 5-10 years

3a. What is the approximate floor space that your business occupies? _____ Sq. Ft.

b. What portion of this space is actually used for retail sales or customer service? _____ %

4a. Do you own or rent your business space? ☐ Own ☐ Rent

b. If you rent, please indicate the monthly or annual rent including utilities?
 \$ _____ Monthly \$ _____ Annually

5. Is your firm considering any important changes?

☐ Expanding in downtown Woburn
☐ Moving out of downtown Woburn
☐ Changes of goods or services offered
☐ Storefront renovations
☐ Interior renovations
☐ Other (specify) _____
☐ No changes

6. What were your gross annual sales during the last fiscal year? \$ _____

7. What have your sales trends been over the last three years?

☐ Up by _____ % annually
☐ Constant
☐ Down by _____ % annually

8. What percentage of your customers would you estimate live in the following communities

Woburn	_____ %	Winchester	_____ %
Stoneham	_____ %	Billerica	_____ %
Reading	_____ %	Other	_____ %

9. What percentage of your customers are: Male _____ % Female _____ %

10. What percentage of your customers are in the following age groups?

Children	_____ %	51-65	_____ %
13-19	_____ %	Over 65	_____ %

11. How do your customers get to downtown Woburn?
 Walk _____ %
 Bus _____ %
 Taxi _____ %
 Car _____ %
 Train _____ %
 Other _____ %
12. What percentage of your customers work in downtown Woburn? _____ %
- 13a. What is your firm's busiest season? (check all that apply)
☐ Fall ☐ Winter ☐ Summer ☐ Spring
- b. What are your firm's busiest days of the week? (check all that apply)
☐ Mon. ☐ Tues. ☐ Wed. ☐ Thurs. ☐ Fri. ☐ Sat. ☐ Sun.
- c. What are your firm's busiest times of day?
☐ 7AM-10AM ☐ 10AM-12PM ☐ 12PM-2PM ☐ 2PM-4PM ☐ 4PM-6PM ☐ 6PM-10PM
14. Where is your major competition located outside of Woburn Center? (please be specific)

- 15a. How many people does your business employ? (Including yourself) _____
 Full-Time _____ Part-Time _____
- b. How many of your employees are at your establishment at any one time? _____
- 16a. How many of your employees normally drive to work and park in the area? _____
- b. Where do those employees generally park? (Please be specific) _____
- 17a. Does your business provide any employee parking? _____ Yes _____ No _____
- b. If you do provide employee parking, how many spaces? _____
- 18a. How many deliveries do you receive? Daily _____ Weekly _____
- b. When do you receive most of your deliveries? ☐ Early AM ☐ Late AM ☐ Early PM ☐ Late PM
- c. Where do you receive most deliveries? ☐ On-Street ☐ Off-Street
19. What do you think are the major problems affecting your business in downtown Woburn?
☐ Parking
☐ Traffic
☐ Shopping center competition
☐ Vandalism/Security
☐ Rundown appearance of downtown Woburn
☐ Lack of store variety
☐ Other(specify) _____
20. What, in your opinion, are the positive characteristics of downtown Woburn?

21. What specific changes would you like to see made by businesses or the City to improve downtown Woburn?

SAMPLE

OFFICE/INDUSTRIAL BUSINESS SURVEY

1a. What type of business do you operate? (Examples: Insurance, Banking, R.E.,etc.) _____

b. Is your business:

☐ Independent ☐ Local Chain ☐ Regional ☐ National Chain

c. What are your business hours?

_____ Mon. _____ Tues. _____ Wed. _____ Thurs. _____ Fri. _____ Sat. _____ Sun.

2. How long has your business been located in downtown Woburn?

☐ Less than 2 years ☐ 10-20 years
☐ 2-5 years ☐ Over 20 years
☐ 5-10 years

3. What is the approximate floor space that your business occupies? _____

4. Do you conduct your business primarily by:

☐ Direct customer relations ☐ Telephone ☐ Mail

5a. Do you own or rent your business space? ☐ Own ☐ Rent

b. If you rent, please indicate the monthly or annual rent including utilities?
\$ _____ Monthly \$ _____ Annually

6. Is your firm considering any important changes?

☐ Expanding in downtown Woburn
☐ Moving out of downtown Woburn
☐ Changes of goods or services offered
☐ Storefront renovations
☐ Interior renovations
☐ Other:(specify) _____
☐ No changes

7. What have your business trends been over the last three years?

☐ Up by _____% annually
☐ Constant
☐ Down by _____% annually

8. What percentage of your customers would you estimate live in the following cities?

Woburn	_____%	Wilmington	_____%	Winchester	_____%
Stoneham	_____%	Burlington	_____%	Billerica	_____%
Reading	_____%	Lexington	_____%	Other	_____%

9. How do your customers get to downtown Woburn?

10a. What are your firms busiest days of the week? (check all that apply)

☐ Mon. ☐ Tues. ☐ Wed. ☐ Thurs. ☐ Fri. ☐ Sat. ☐ Sun.

b. What are your firm's busiest times of day?

☐ 7AM-10AM ☐ 10AM-12PM ☐ 12PM-2PM ☐ 2PM-4PM ☐ 4PM-6PM ☐ 6PM-10PM

11. Where is your major competition located outside Woburn Center? (Please be specific)

12 a. How many people does your business employ? (Including yourself)

Full-Time

Part-Time

b. How many of your employees are at your establishment at any one time? _____

13 a. How many of your employees normally drive to work and park in the area? _____

b. Where do those employees generally park? (Please be specific) _____

14 a. Does your business provide any employee parking? ☐ Yes ☐ No

b. If you do provide parking, how many spaces do you provide? _____

15. What do you think are the major problems affecting your business in downtown Woburn?
(check all that apply)

☐	Parking
☐	Traffic
☐	Shopping center competition
☐	Vandalism/Security
☐	Run-down appearance
☐	Lack of Store variety
☐	Other (specify) _____

16. What, in your opinion, are the positive characteristics of downtown Woburn?

17. What specific changes would you like to see made by businesses or the City to improve downtown Woburn?

SAMPLE BUSINESS SURVEY RESULTS

WALPOLE BUSINESS SURVEY SUMMARY

The following are results tabulated from a survey of downtown Walpole business establishments. The survey was administered by MAPC in July of 1980.

BUSINESS TYPES/PERCENTAGE OF EXISTING FLOOR SPACE

Apparel	8.5%
Drugs	3.9%
Hardware/Building Supplies	2.8%
Furniture/Appliances	1.1%
Food and Liquor	11.4%
General Merchandise	-0-
Miscellaneous Retail	4.7%
Eating and Drinking	9.4%
Personal Services	11.5%
Professional Services	26.7%
Automotive	17.0%
Vacant	3.0%

NUMBER OF YEARS IN BUSINESS

Less than 2 years	5.0%
2-5 years	26.2%
5-10 years	18.0%
10-20 years	13.1%
Over 20 years	27.7%

SALES TRENDS (3 years)

Up (by an average of 24% %/yr.)	71.7%
Constant	8.7%
Down (by an average of 13% %/yr.)	19.6%

ANNUAL SALES

Range	\$5,600 - \$1,000,000
Mean	\$ 251,000
Median	\$ 150,000

FLOOR SPACE

Range	250 Ft. ² -30,000Ft. ²
Mean	1,530Ft. ²
Median	1,000Ft. ²

OWN/RENT

Own	23%
Rent	77%

ANNUAL RENT

Range	\$2,100/yr.-\$13,500
Mean	\$8,000/yr.
Median	\$5,700/yr.

PEAK SEASON (Retail only)

Fall	35.5%
Winter	32.9%
Spring	10.5%
Summer	21.1%

PEAK DAY

Monday	18.1%
Tuesday	10.2%
Wednesday	11.3%
Thursday	17.5%
Friday	24.3%
Saturday	16.9%
Sunday	1.7%

PEAK TIMES

7-10 A.M.	8.8%
10-12 Noon	25.7%
12-2 P.M.	23.0%
2-4 P.M.	24.8%
4-6 P.M.	12.4%
6-10 P.M.	5.3%

NUMBER OF FULL-TIME EMPLOYEES

Range	0-18
Mean	4
Median	3

NUMBER OF PART-TIME EMPLOYEES

Range	0-166
Mean	5
Median	2

EMPLOYEE PARKING LOCATIONS

Municipal Lot	31.0%
Employers Lot	43.0%

Main Street
Side Street
Other

13.8%
6.1%
6.1%

BUSINESS PROVIDING EMPLOYEE PARKING

Yes	64.4%
No	35.6%

CUSTOMER RESIDENCE

Walpole	60.8%
Medfield	10.0%
Norwood	8.3%
Norfolk	6.6%
Foxborough	5.0%
Sharon	3.8%
Westwood	2.3%
Dover	1.0%
Other	2.2%

CUSTOMER SEX (Retail only)

Male	47.4%
Female	52.6%

CUSTOMER AGES

Child	5.5%
13-19	9.0%
20-35	28.5%
35-50	38.0%
50-65	14.0%
Over 65	5.0%

CUSTOMER TRANSIT MODE

Walk	9.0%
Drive	5.4%
Bus	2.4%
Taxi	1.0%
Other	2.2%

LOCATION OF MAJOR COMPETITION

Elsewhere in Walpole	23.1%
Norwood	36.5%
Medfield	7.7%
Braintree	3.8%
Westwood	3.8%
Sharon	3.8%
Boston	3.8%
Other	17.5%

BUSINESS CHANGES ANTICIPATED

Expansion in downtown Walpole	9.8%
Interior renovations	19.7%
Storefront improvements	3.3%
Moving out of downtown Walpole	0.0%
Changes in goods/services	6.6%
Other	8.2%
No change	52.4%

PROBLEMS AFFECTING BUSINESS

Parking	25.9%
Traffic	16.1%
Shopping center competition	12.5%
Vandalism/Security	8.9%

Appearance of downtown	16.1%
Lack of store variety	17.8%
Other	2.7%

POSITIVE CHARACTERISTICS

Appearance of downtown	22.2%
Business/Shopper attitude	22.2%
Convenience/Location	17.5%
Small town atmosphere	34.9%
Shopping quality and variety	3.2%

DESIRED IMPROVEMENTS

Business Improvements	14.3%
More store variety	63.6%
Better advertisement and business promotion	36.4%

Parking and Traffic	24.7%
More parking	21.0%
Improved traffic flow	73.7%
Other	5.3%

Urban Design	44.1%
Better signage	23.5%
Storefront renovations	35.3%
Improved pedestrian areas	26.5%
Other	14.7%

Other	16.9%
Better Security	76.9%
Other	23.1%

AMPLE SHOPPERS SURVEY

Dear Shopper: The following QUESTIONNAIRE is designed to help the Town of Hudson study business activity in Hudson Center. Your answers will help us!

1. HOW OFTEN DO YOU COME TO HUDSON CENTER? (check one)
___ daily ___ about once a week ___ about once a month
___ more than once a week ___ about twice a month ___ less than once a month
2. DO YOU USUALLY COME TO HUDSON CENTER TO: (check all that apply)
___ shop ___ go to a bank or other professional office
___ work ___ go to the Post Office or other government office
3. WHAT PRODUCTS AND/OR SERVICES ARE YOU SHOPPING FOR TODAY? (check all that apply)
___ food ___ tobacco products ___ garden supply/florist
___ clothing ___ furniture ___ beauty parlor/barber
___ shoes ___ office supplies ___ professional services
___ card/gifts ___ hardware ___ banking
___ drug store ___ liquor store ___ restaurant/bar
___ sporting goods ___ newspaper/magazines ___ other (specify) _____
4. WHY DO YOU SHOP IN HUDSON CENTER? (check one)
___ convenience ___ stores ___ services ___ other (specify) _____
5. WHAT ADDITIONAL GOODS OR SERVICES WOULD YOU MOST LIKE TO SEE AVAILABLE IN THIS DOWNTOWN?
6. PLEASE ESTIMATE HOW MUCH YOU USUALLY SPEND IN THIS DOWNTOWN ON AN AVERAGE SHOPPING TRIP?
(check one) ___ under \$5 ___ \$5 to \$10 ___ \$10 to \$25 ___ over \$25
7. HOW DID YOU GET TO HUDSON CENTER TODAY? (check one)
___ walk ___ car ___ bicycle
8. IF YOU DROVE, WHERE DID YOU PARK? (be specific) _____
9. HOW LONG WILL YOU BE IN HUDSON CENTER TODAY? (excluding time spent on this survey)
___ under 15 minutes ___ 30 minutes to 1 hour ___ over 2 hours
___ 15 to 30 minutes ___ 1-2 hours
10. WHERE DO YOU LIVE? (check one)
___ Hudson Center ___ Marlboro ___ Stow ___ Berlin
___ elsewhere in Hudson ___ Sudbury ___ Bolton ___ other _____
1. WHERE ELSE DO YOU USUALLY SHOP FOR FOOD OR CONVENIENCE ITEMS? (check one)
___ elsewhere in Hudson ___ Stow ___ Sudbury ___ Maynard
___ Marlboro ___ Bolton ___ Berlin ___ other (specify) _____
2. WHERE ELSE DO YOU USUALLY SHOP FOR CLOTHING, FURNITURE OR OTHER MAJOR PURCHASES? (check one)
___ elsewhere in Hudson ___ Sudbury ___ Worcester
___ Marlboro ___ Framingham ___ other (specify) _____
3. WHAT ARE THE MAJOR PROBLEMS IN HUDSON CENTER TODAY? (check all that apply)
___ parking ___ run-down appearance
___ traffic ___ lack of store variety ___ other (specify) _____
4. HAS THE QUALITY OF HUDSON CENTER GOODS & SERVICES CHANGED IN THE LAST 3 YEARS? (check one)
___ better ___ no change ___ worse
5. DO YOU HAVE ANY SPECIFIC IDEAS FOR WAYS THAT BUSINESS OR TOWN GOVERNMENT CAN IMPROVE HUDSON CENTER? _____
6. PLEASE INDICATE YOUR AGE AND SEX.
___ child ___ 20-35 ___ male
___ teenager ___ 35-50 ___ over 65 ___ female

SAMPLE SHOPPER SURVEY RESULTS

WALPOLE SHOPPER SURVEY SUMMARY

The following are results tabulated from a survey of downtown Walpole Shoppers conducted in the summer of 1980. (Results do not necessarily add to 100%).

FREQUENCY OF TRIPS TO DOWNTOWN WALPOLE

Daily	40.5%
More than once a week	32.1%
About once a week	19.1%
About twice a month	4.6%
About once a month	1.4%
Less than once a month	2.3%

REASON FOR COMING TO DOWNTOWN WALPOLE

To shop	52.4%
To work	20.5%
For a professional service	54.8%
For a government service	25.7%

WHAT PRODUCT OR SERVICE ARE YOU SHOPPING FOR TODAY?

Food	53.5%
Clothing	12.8%
Shoes	4.2%
Card/Gift	15.5%
Drugs	23.3%
Sporting goods	2.7%
Tobacco products	5.7%
Hardware	15.5%
Office supplies	1.5%
Liquor	8.1%

Newspaper/magazine	11.3%
Florist	5.4%
Beauty parlor/barber	8.7%
Professional services	3.6%
Banking	50.7%
Post office	24.5%
Restaurant Lounge	13.2%
Other	6.6%

WHY DO YOU SHOP IN DOWNTOWN WALPOLE

Convenience	75.4%
Like the stores	9.8%
Like the services	10.4%
Other	4.5%

ADDITIONAL GOODS AND SERVICES DESIRED

Clothing Store	14.2%
Restaurant/Lounge	14.2%
Five and Ten	10.4%
Movie Theater	6.6%
Ice Cream Parlor	6.6%
Discount Store	6.6%
Sporting Goods	6.6%
Youth Center	5.7%
Book Store	2.8%
Improved Security	2.8%
More Store Variety	1.9%
Supermarket	1.9%
Fabric Store	1.9%
Dry Cleaning	1.9%
Other	10.2%
Satisfied customers	5.7%

AMOUNT SPENT PER TRIP

Under \$5.00	19.5%
\$5.00-\$10.00	24.9%
\$10.00-\$25.00	30.8%
Over \$25.00	24.9%

TRANSPORTATION

Walk	12.3%
Car	82.1%
Bicycle	3.2%
Taxi/Bus	1.5%
Train	0.9%

WHERE DID YOU PARK IF YOU DROVE?

Main Street	31.9%
Shopping Center	31.6%
Municipal Lot	16.7%
Stone Street	3.0%
Behind Bank	9.1%
Other Streets	7.6%

LENGTH OF STAY IN DOWNTOWN

Under 15 minutes	11.7%
15-30 minutes	26.8%
30-60 minutes	34.7%
1-2 hours	14.3%
Over 2 hours	12.5%

WHERE DO YOU LIVE?

Downtown Walpole	10.7%
Elsewhere in Walpole	62.6%

Medfield	6.1%
Norfolk	3.5%
Foxborough	1.7%
Wrentham	1.7%
Norwood	1.7%
Other	11.9%

WHERE ELSE DO YOU SHOP FOR CONVENIENCE ITEMS

East Walpole	6.2%
Walpole Mall	53.3%
Norwood	10.6%
Medfield	6.5%
Westwood	1.9%
Other	21.5%

WHERE ELSE DO YOU SHOP FOR COMPARISON ITEMS

East Walpole	2.1%
Walpole Mall	47.9%
Braintree	16.3%
Medfield	1.8%
Framingham/Natick	12.6%
Other	19.3%

MAJOR PROBLEMS IN DOWNTOWN WALPOLE

Parking	40.7%
Traffic	23.0%
Appearance	14.2%
Lack of Store Variety	39.2%
Other	7.5%

HAS THE QUALITY OF THE DOWNTOWN CHANGED?

Better	46.3%
No change	48.5%
Worse	5.2%

DESIRED IMPROVEMENTS

More Parking	12.8%
Greater store variety	12.8%
Better traffic controls	11.9%
Improved recreation facilities	10.1%
Storefront renovation	7.3%
Better maintenance	7.3%
Public transportation	5.5%
Lower prices	3.7%
Entertainment	2.8%
Other	6.4%
No change desired	19.3%

CUSTOMER AGE

Child	0.6%
Teenager	13.1%
20-35	34.3%
35-50	31.1%
50-65	14.0%
Over 65	7.0%

CUSTOMER SEX

Male	46.6%
Female	53.4%

CENSUS DEFINITIONS OF RETAIL CATEGORIES*

BUILDING MATERIALS, HARDWARE, GARDEN SUPPLY, AND MOBILE HOME DEALERS (SIC MAJOR GROUP 52)

This major group includes retail establishments primarily engaged in selling lumber and other building materials; paint, glass, and wallpaper; hardware; nursery stock; lawn and garden supplies; and mobile homes. It includes lumber and other building materials dealers and paint, glass, and wallpaper stores selling to the general public, even if sales to contractors account for a larger proportion of total sales; these establishments are known as "retail" in the trade. Establishments primarily selling these products but not selling to the general public are classified in wholesale trade.

GENERAL MERCHANDISE GROUP STORES (SIC MAJOR GROUP 53)

This major group includes retail stores which sell a number of lines of merchandise, such as dry goods, apparel and accessories, furniture and home furnishings, small wares, hardware, and food. The stores included in this group are known as department stores, variety stores, general merchandise stores, general stores, etc. Establishments primarily engaged in selling used general merchandise are classified in SIC 593, and those selling general merchandise by mail, vending machine, or direct selling are classified in SIC 596.

FOOD STORES (SIC MAJOR GROUP 54)

This major group includes retail stores primarily engaged in selling food for home preparation and consumption. Establishments primarily engaged in selling prepared foods and drinks for consumption on the premises are classified in major group 58, and stores primarily engaged in selling packaged beers and liquors are classified in SIC 5921.

AUTOMOTIVE DEALERS AND GASOLINE SERVICE STATIONS
(SIC MAJOR GROUP 55)

This major group includes retail dealers selling new and used automobiles, boats, recreational and utility trailers, and motorcycles; dealers selling new automobile parts and accessories; and gasoline service stations selling gasoline and lubricating oils. It includes establishments dealing exclusively in used automobiles, but not establishments dealing exclusively in used parts (SIC 5931). Also included are automobile repair shops maintained by establishments engaged in the sale of new automobiles. Automotive distributors, the greater part of whose sales are to dealers or to institutional or industrial users, are classified in wholesale trade.

APPAREL AND ACCESSORY STORES
(SIC MAJOR GROUP 56)

Establishments in this major group are primarily engaged in selling clothing of all kinds and related articles for personal wear and adornment. Not included are establishments which meet the criteria for "Department stores" (SIC 5311) or "Miscellaneous general merchandise stores" (SIC 5399) even though most of their receipts are from the sale of apparel and apparel accessories.

FURNITURE, HOME FURNISHINGS, AND EQUIPMENT STORES
(SIC MAJOR GROUP 57)

This major group includes retail stores selling goods used for furnishing the home, such as furniture, floor coverings, draperies, glass and chinaware, domestic stoves, refrigerators, and other household electrical and gas appliances. Establishments selling electrical and gas appliances are included in this group only if the major part of their sales consists of articles for home use. Dealers primarily engaged in selling antique and secondhand furniture are classified in SIC 593. Stores primarily engaged in selling merchandise but also providing an interior decorating service are classified according to the merchandise handled. Interior designers primarily engaged in advising clients on the selection of interior decorations are classified in SIC 7399.

EATING AND DRINKING PLACES
(SIC MAJOR GROUP 58)

This major group includes retail establishments selling prepared food and drinks for consumption on the premises; it also includes lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption. Restaurants, lunch counters, and drinking places operated as a subordinate service facility by other establishments are not included in this industry unless they are operated as leased departments by outside operators. Thus, restaurants and coffee shops operated by hotels are classified in major group 70 and those operated by department stores are classified in major group 53.

MISCELLANEOUS RETAIL STORES
(SIC MAJOR GROUP 59)

This major group includes retail establishments not elsewhere classified. These establishments fall into the following categories: Drug stores, liquor stores, used merchandise stores, miscellaneous shopping goods stores, nonstore retailers, fuel and ice dealers, florists, cigar stores and stands, news dealers and newsstands, and miscellaneous retail stores not elsewhere classified.

*See -- 1977 CENSUS OF RETAIL TRADE: MASSACHUSETTS, BUREAU OF THE CENSUS, Washington, D.C.: Appendix A -- for complete definitions.

RETAIL EXPENDITURES AS A PERCENT OF INCOME

Total sales for major retail categories is found in the US Census of Retail Trade (published once every five years). Gross Income for an area, such as the State or the Boston SMSA, is Total Population multiplied by Per-Capita Income.

To find expenditures by retail category as a percent of income, calculate Total Sales for each retail category as a percent of Gross Income. For example, if Total Building and Hardware Sales in Massachusetts (1977) were \$775,702,000 and estimated Gross Income in Massachusetts (1977) was \$32,505,630,000, then Building and Hardware Sales equals 2.4% of per-capita income.

The table below shows 1977 State Per-Capita Expenditure Percentages by Retail Category. (Boston SMSA Per-Capita Expenditure Percentages are found in the Marketing section of this report.)

1977 State Per-Capita Expenditure Percentages

Building Materials/Hardware	2.4%
General Merchandise	7.3%
Food Stores	13.0%
Apparel/Accessories	3.3%
Furniture/Appliances	2.2%
Eating/Drinking	5.6%
Liquor Stores	1.8%
Miscellaneous Retail	2.9%
Drug Stores	1.8%
Personal Services	2.0%

PARKING AND TRAFFIC



S1 S2 S3 S4 TAXI S5 S6 S7

S8 S9 S10

MAIN S

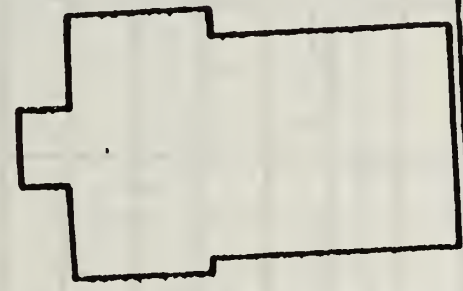
S23

S32 S31 S30 S29 S28 S27 S26 S25 S24



A14 A13 A12 A11 A10 A9 A8 A7 A6

A15
A16
A17



A18 A19 A20 A21 A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 A32 A33 A34

A20 A21 A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 A32 A33 A34

A25 A26 A27 A28 A29 A30 A31 A32 A33 A34

A26 A27 A28 A29 A30 A31 A32 A33 A34

A27 A28 A29 A30 A31 A32 A33 A34

A28 A29 A30 A31 A32 A33 A34

A29 A30 A31 A32 A33 A34

A30 A31 A32 A33 A34

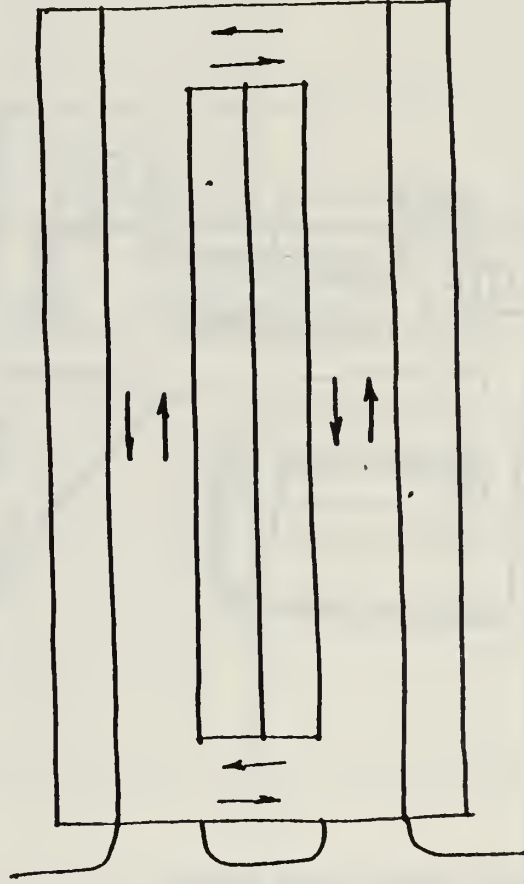
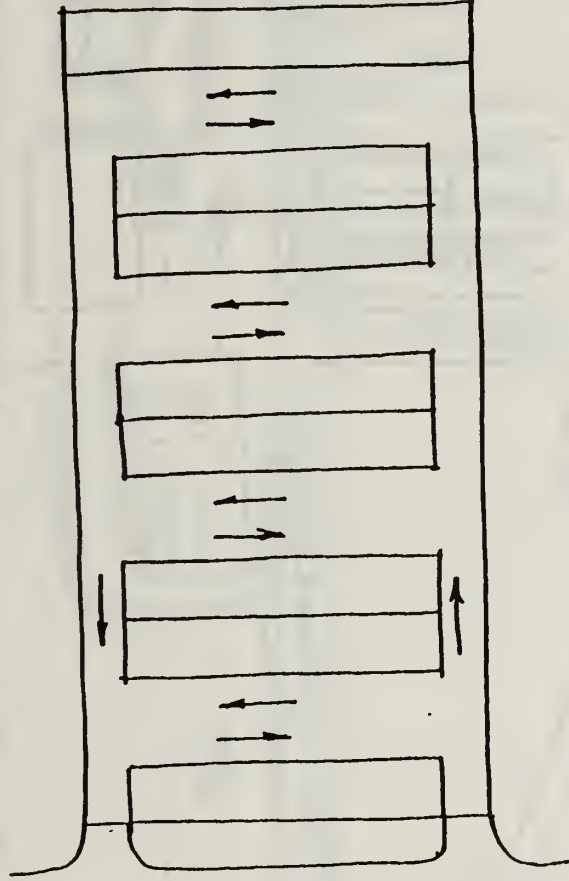
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A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 A32 A33 A34

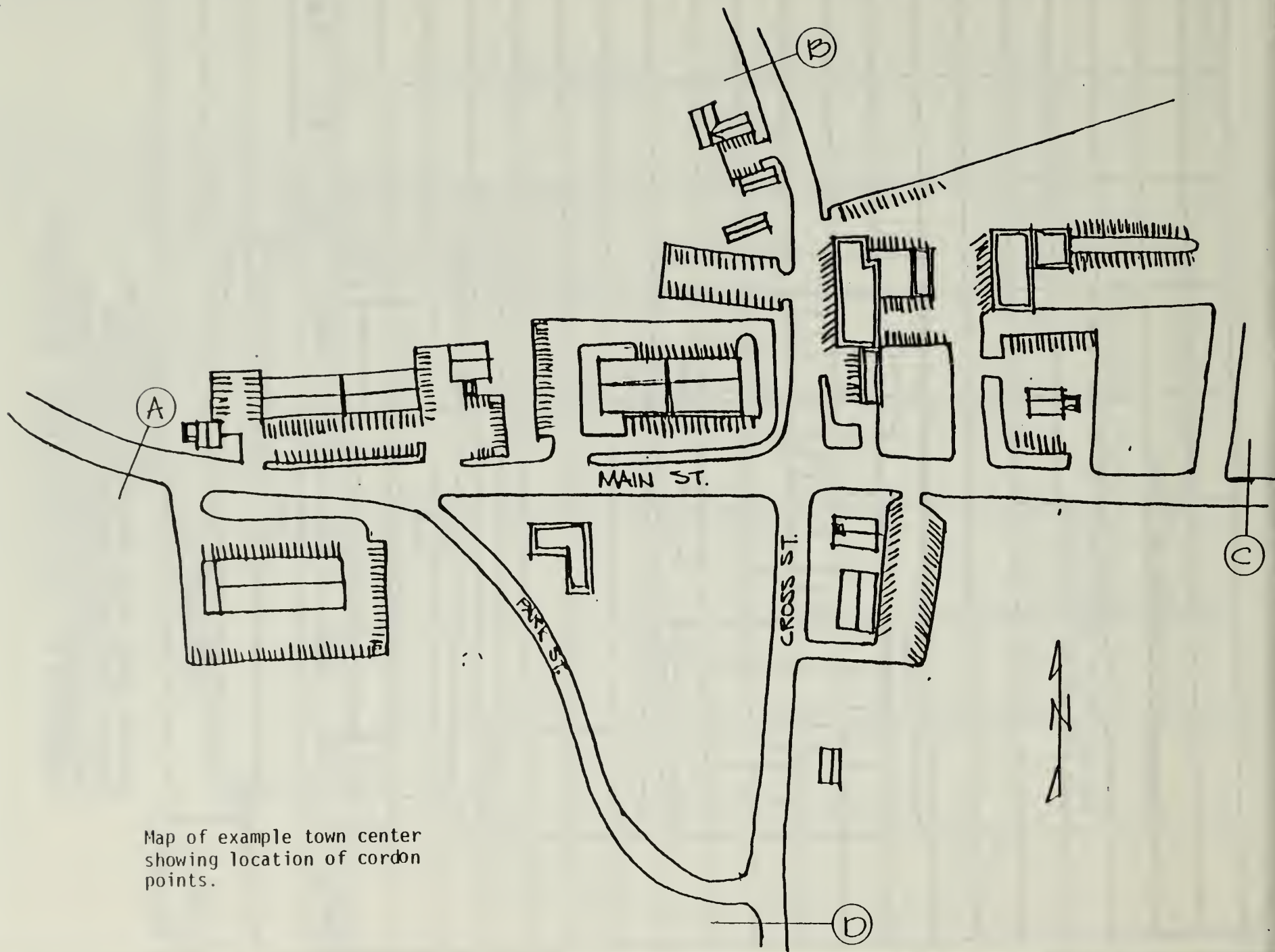
Map of spaces for parking
occupancy/duration study.

Fundamentals of Parking Lot Layout

Examples of poor layout with multiple cross aisles and poor search pattern resulting in fewer spaces even with one-way side aisles.

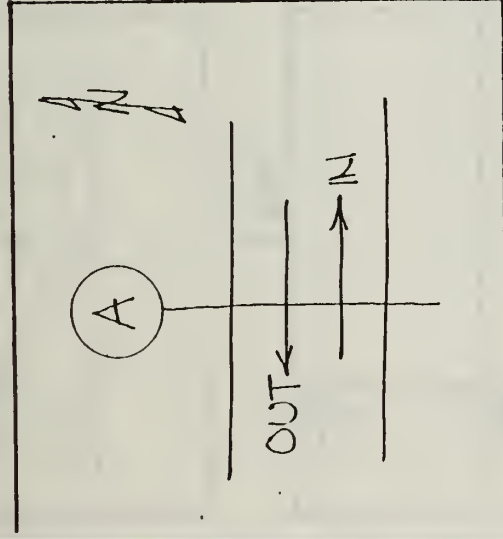


Improved layout on the same site resulting in easy search without need to reenter street and more spaces despite greater flexibility of all two-way circulation.



Map of example town center showing location of cordon points.

NAPC CORDON COUNT

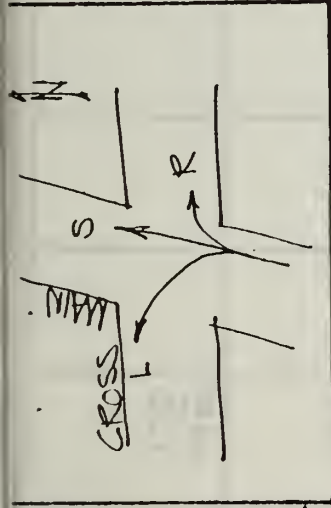


Location # A : _____
 Date _____
 Recorder _____
 Weather _____
 Comments _____

	IN			OUT		
	Cars	Trucks & Busses	Peds.	Cars	Trucks & Busses	Peds.
:00 :15						
:15 :30						
:30 :45						
:45 :00						

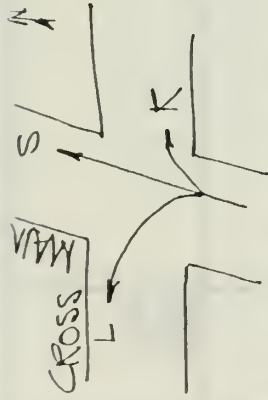
Sample work sheets for turning movement counts.
1st work sheet for unsignalized intersections.
2nd work sheet for signalized intersections.

"Cycles cleared" is an estimate by the counter of all signal cycles not used at a near capacity, i.e., cycles with significant gaps in the traffic flow or that clear before the cycle is complete.



Location: _____ Date: _____
 Recorder: _____
 Weather: _____
 Comments: _____

Left		Straight		Right	
:00 :15					
:15 :30					
:30 :45					
:45 :00					
:00 :15					
:15 :30					
:30 :45					
:45 :00					



Recorder: _____ Date: _____
Weather: _____
Comments: _____

	Left	Straight	Right	Cycles cleared	Cycles not cleared
:00 :15					
:15 :30					
:30 :45					
:45 :00					
:00 :15					
:15 :30					
:30 :45					
:45 :00					

Intersection Capacity work sheet with tables and charts for evaluating capacity factors and for estimating resulting queue length. Next six pages.

TWO WAY

PARKING

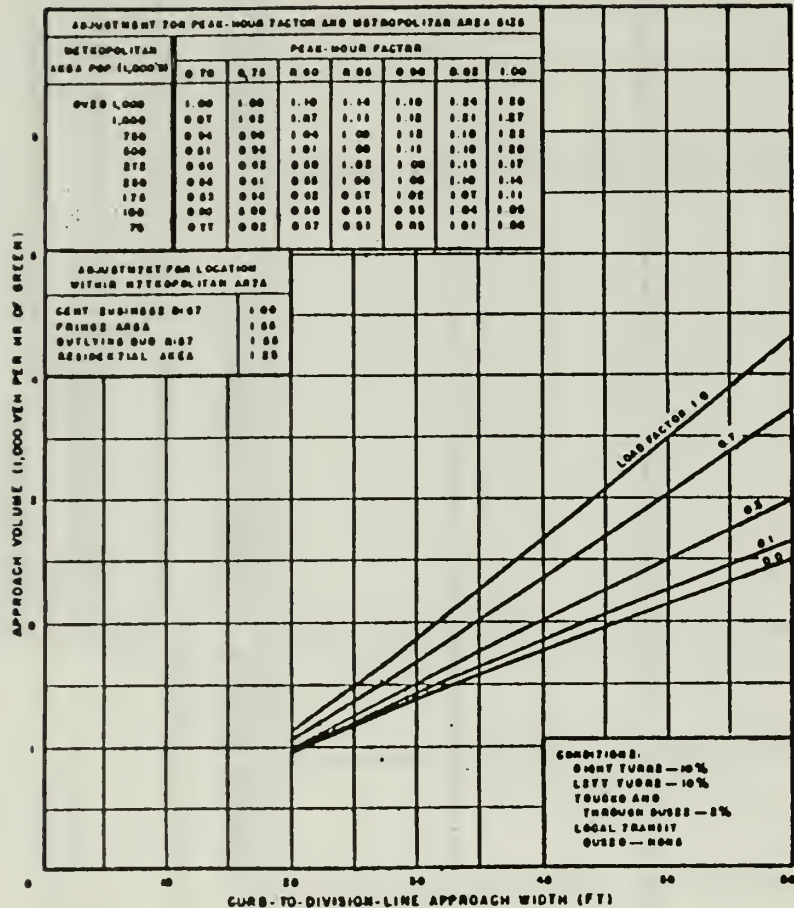


Figure 6.9. Urban Intersection approach service volume, in vehicles per hour of green signal time, for two-way streets with parking.

NO PARKING

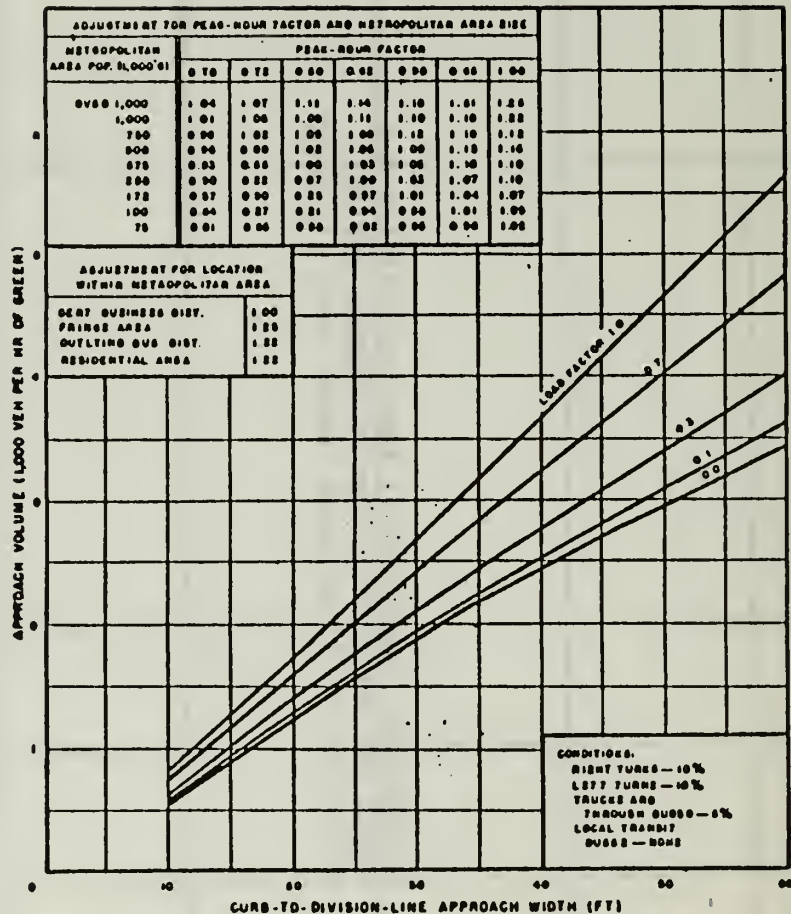


Figure 6.8. Urban Intersection approach service volume, in vehicles per hour of green signal time, for two-way streets with no parking.

NO PARKING

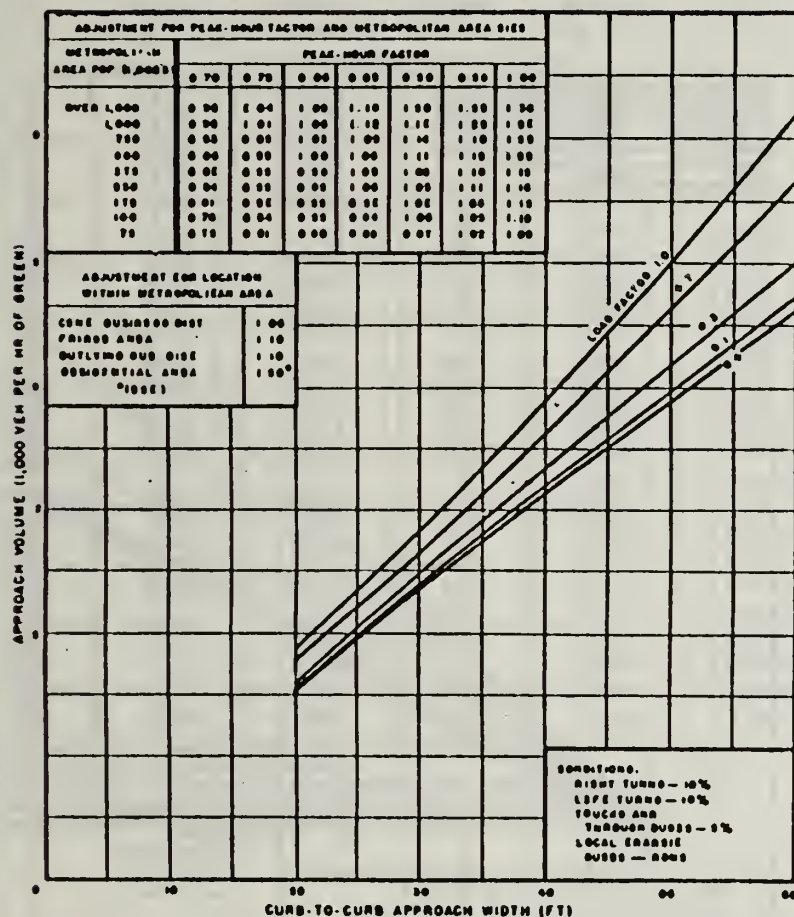


Figure 6.5. Urban intersection approach service volume, in vehicles per hour of green signal time, for one-way streets with no parking.

PARK-ONE SIDE

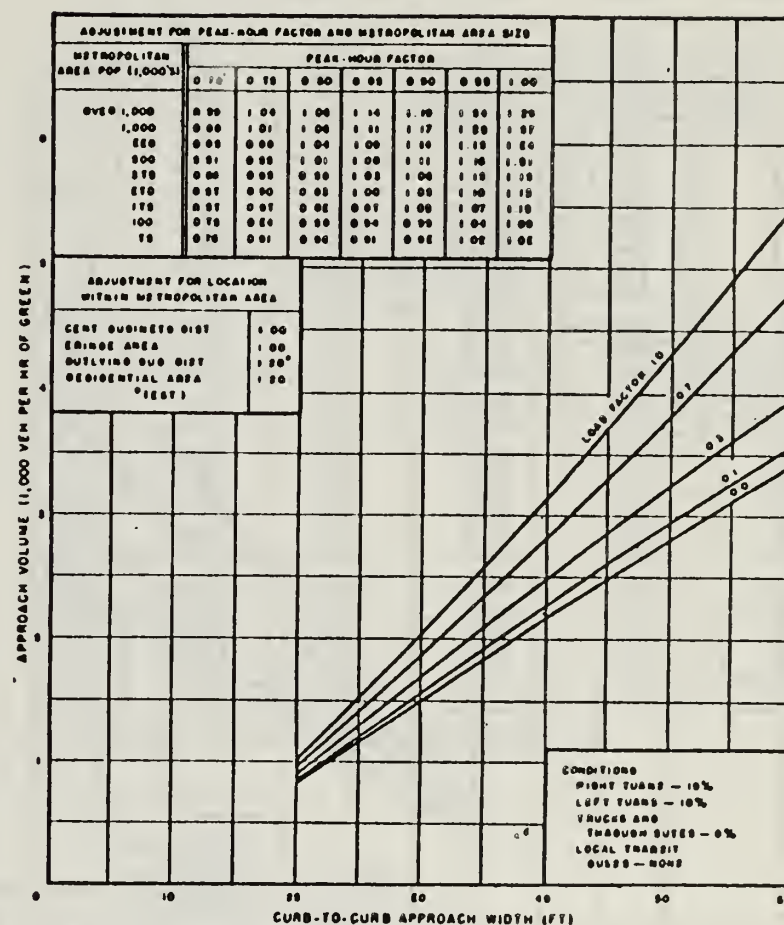


Figure 6.6. Urban intersection approach service volume, in vehicles per hour of green signal time, for one-way streets with parking one side.

PARK- TWO SIDES

RURAL

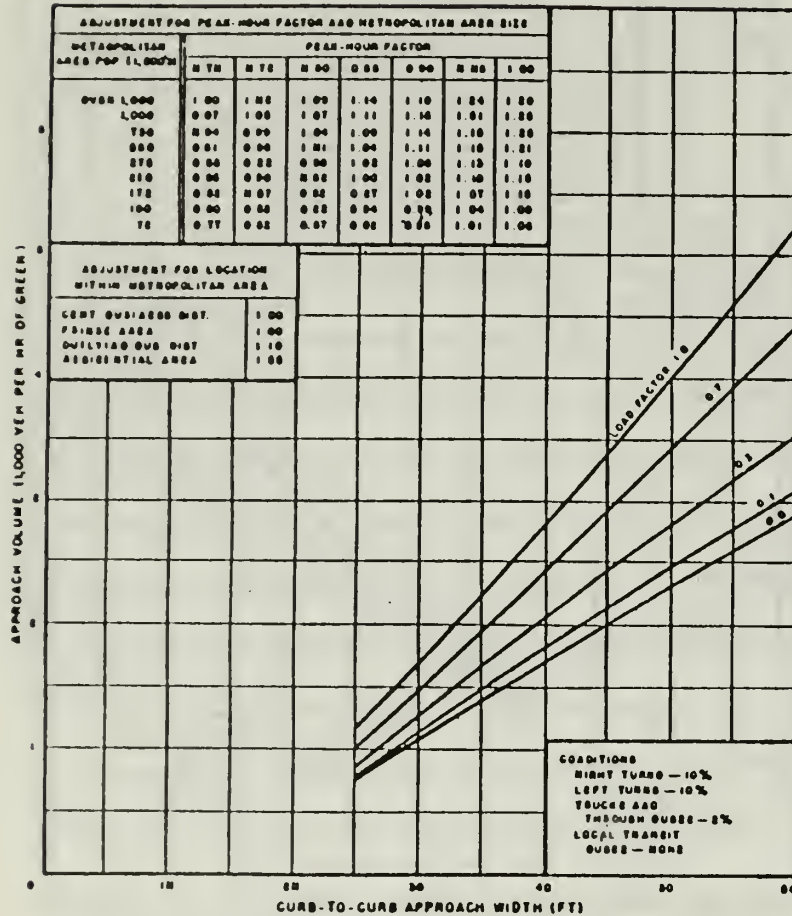


Figure 6.7. Urban Intersection approach service volume, in vehicles per hour of green signal time, for one-way streets with parking both sides.

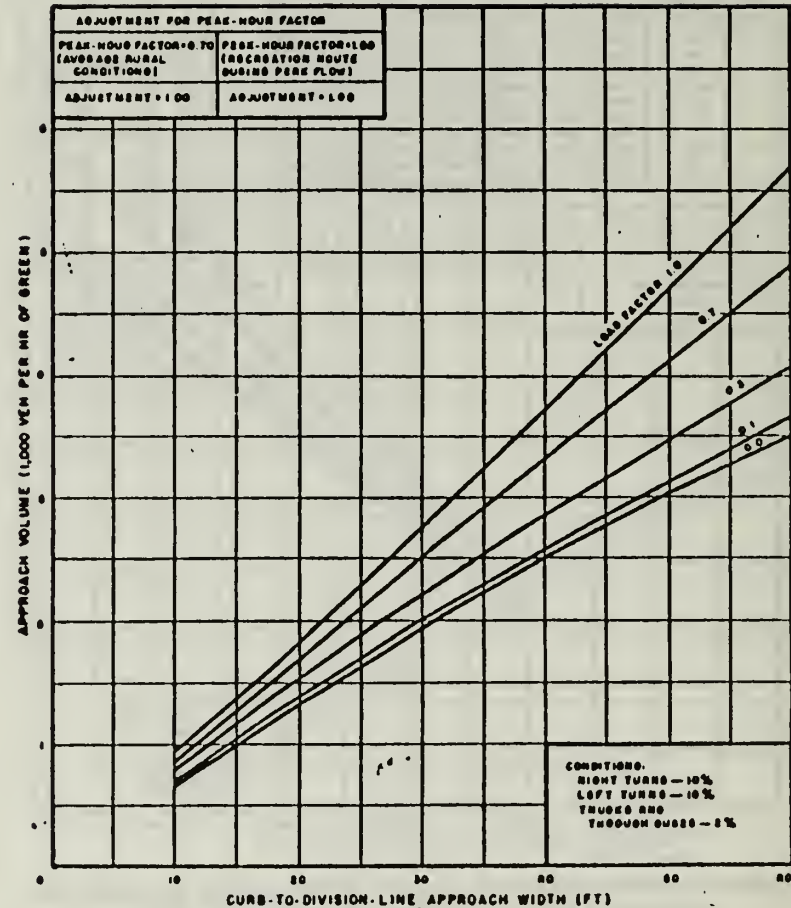


Figure 6.10. Rural Intersection approach service volume, in vehicles per hour of green signal time, for two-way highways with no parking on the traveled way.

TABLE 6.4—ADJUSTMENT FACTORS FOR RIGHT TURNS ON TWO-WAY STREETS,* RIGHT TURNS ON ONE-WAY STREETS,* AND LEFT TURNS ON ONE-WAY STREETS*

TURNS (%)	ADJUSTMENT FACTOR					
	WITH NO PARKING*			WITH PARKING*		
	APPROACH WIDTH ≤15 FT	APPROACH WIDTH 16 TO 24 FT	APPROACH WIDTH 25 TO 34 FT	APPROACH WIDTH ≤20 FT	APPROACH WIDTH 21 TO 29 FT	APPROACH WIDTH 30 TO 39 FT
0	1.20	1.050	1.025	1.20	1.050	1.025
1	1.18	1.045	1.020	1.18	1.045	1.020
2	1.16	1.040	1.020	1.16	1.040	1.020
3	1.14	1.035	1.015	1.14	1.035	1.015
4	1.12	1.030	1.015	1.12	1.030	1.015
5	1.10	1.025	1.010	1.10	1.025	1.010
6	1.08	1.020	1.010	1.08	1.020	1.010
7	1.06	1.015	1.005	1.06	1.015	1.005
8	1.04	1.010	1.005	1.04	1.010	1.005
9	1.02	1.005	1.000	1.02	1.005	1.000
10	1.00	1.000	1.000	1.00	1.000	1.000
11	0.99	0.995	1.000	0.99	0.995	1.000
12	0.98	0.990	0.995	0.98	0.990	0.995
13	0.97	0.985	0.995	0.97	0.985	0.995
14	0.96	0.980	0.990	0.96	0.980	0.990
15	0.95	0.975	0.990	0.95	0.975	0.990
16	0.94	0.970	0.985	0.94	0.970	0.985
17	0.93	0.965	0.985	0.93	0.965	0.985
18	0.92	0.960	0.980	0.92	0.960	0.980
19	0.91	0.955	0.980	0.91	0.955	0.980
20	0.90	0.950	0.975	0.90	0.950	0.975
22	0.89	0.940	0.980	0.89	0.940	0.980
24	0.88	0.930	0.985	0.88	0.930	0.985
26	0.87	0.920	0.990	0.87	0.920	0.990
28	0.86	0.910	0.995	0.86	0.910	0.995
30+	0.85	0.900	1.000	0.85	0.900	1.000

* No separate turning lanes or separate signal indications.

b Handle right turns and left turns separately in all computations; do not sum.

c No adjustment necessary for approach width of 35 ft or more; that is, use factor of 1.000.

d No adjustment necessary for approach width of 40 ft or more; that is, use factor of 1.000.

TABLE 6.5—ADJUSTMENT FACTORS FOR LEFT TURNS ON TWO-WAY STREETS*

TURNS (%)	ADJUSTMENT FACTOR					
	WITH NO PARKING			WITH PARKING		
	APPROACH WIDTH ≤15 FT	APPROACH WIDTH 16 TO 34 FT	APPROACH WIDTH ≥35 FT	APPROACH WIDTH ≤20 FT	APPROACH WIDTH 21 TO 39 FT	APPROACH WIDTH ≥40 FT
0	1.30	1.10	1.050	1.30	1.10	1.050
1	1.27	1.09	1.045	1.27	1.09	1.045
2	1.24	1.08	1.040	1.24	1.08	1.040
3	1.21	1.07	1.035	1.21	1.07	1.035
4	1.18	1.06	1.030	1.18	1.06	1.030
5	1.15	1.05	1.025	1.15	1.05	1.025
6	1.12	1.04	1.020	1.12	1.04	1.020
7	1.09	1.03	1.015	1.09	1.03	1.015
8	1.06	1.02	1.010	1.06	1.02	1.010
9	1.03	1.01	1.005	1.03	1.01	1.005
10	1.00	1.00	1.000	1.00	1.00	1.000
11	0.98	0.99	0.995	0.98	0.99	0.995
12	0.96	0.98	0.990	0.96	0.98	0.990
13	0.94	0.97	0.985	0.94	0.97	0.985
14	0.92	0.96	0.980	0.92	0.96	0.980
15	0.90	0.95	0.975	0.90	0.95	0.975
16	0.89	0.94	0.970	0.89	0.94	0.970
17	0.88	0.93	0.965	0.88	0.93	0.965
18	0.87	0.92	0.960	0.87	0.92	0.960
19	0.86	0.91	0.955	0.86	0.91	0.955
20	0.85	0.90	0.950	0.85	0.90	0.950
22	0.84	0.89	0.940	0.84	0.89	0.940
24	0.83	0.88	0.930	0.83	0.88	0.930
26	0.82	0.87	0.920	0.82	0.87	0.920
28	0.81	0.86	0.910	0.81	0.86	0.910
30+	0.80	0.85	0.900	0.80	0.85	0.900

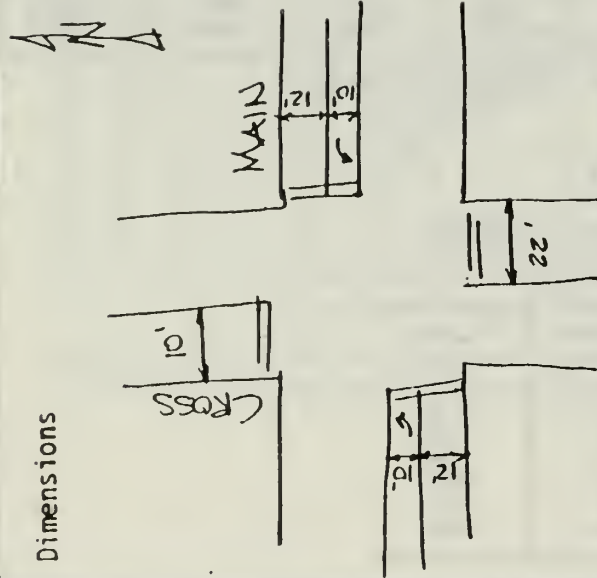
* No separate turning lanes or separate signal indications.

TABLE 6.6—TRUCK AND THROUGH BUS ADJUSTMENT FACTORS

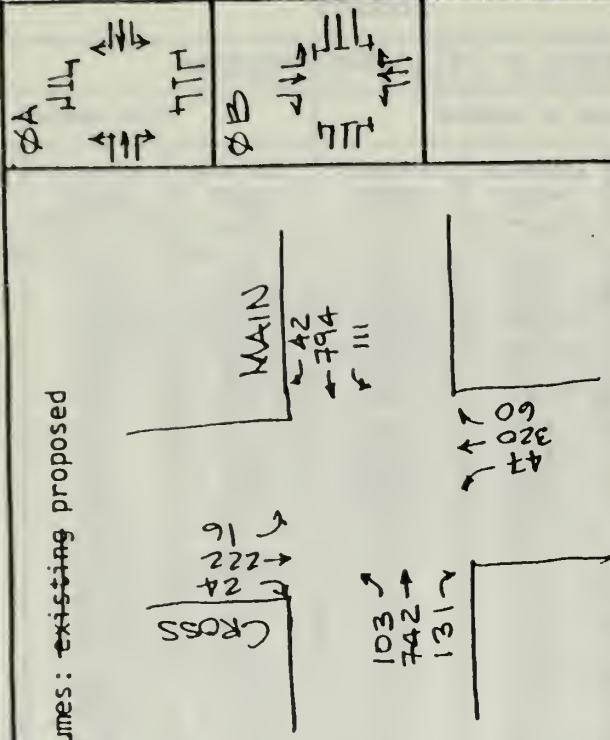
TRUCKS AND THROUGH BUSES (%)	CORRECTION FACTOR	TRUCKS AND THROUGH BUSES (%)	CORRECTION FACTOR	TRUCKS AND THROUGH BUSES (%)	CORRECTION FACTOR
0	1.05	7	0.98	14	0.91
1	1.04	8	0.97	15	0.90
2	1.03	9	0.96	16	0.89
3	1.02	10	0.95	17	0.88
4	1.01	11	0.94	18	0.87
5	1.00	12	0.93	19	0.86
6	0.99	13	0.92	20	0.85

CROSS E MAIL 2

Dimensions



Volumes: ~~existing~~ proposed



Approach	MAIN E/B	MAIN W/B	Gross N/B	Gross S/B
volume	976	968	427	262
sep. left	Yes No	Yes No	Yes No	Yes No
cap/hr. grn	230	220		
Volume	103	111		
G/C				
Volume				
Main Approach: Width	873	850	427	262
% trucks	5	5	5	5
% lefts	0	0	11	6
% rights	15	5	14	9
p.h.f.	.9	.9	.85	.85
location factor	1.25	1.25	1.25	1.25
Operational Characteristics	1-way 2 way	1-way 2 way	1-way 2 way	1-way 2 way
Cycle Length	100	100	100	100
.85 lf cap/hr. grn.	900	900	1200	800
.85 lf x G/C = CAP	1010	1170	510	380
Max cap @ 1.0.s.	1290	1540	420	280
V/C	.86	.73	.84	.69

Central Transportation Planning Staff

Project _____

Subject _____

Sheet No. _____ of _____

File No. _____

Date _____

Comp By _____

Chkd By _____

DEFINITION OF TERMS

C = Cycle Length (sec)

q = Approach Flow (veh/sec)

G = Effective Green Time (sec)

d = Average Delay per vehicle (sec)

R = Red Time of Approach (sec)

s = Saturation Flow (veh/sec)

DHV = Design Hour Volume (veh)

n = Average Queue Number (veh)

N = Number of Lanes

L = Queue Length (feet)

DATA NEEDS

C = _____

G = _____

R = _____

DHV = _____

N = _____

INTERMEDIATE CALCULATIONS:

s = 0.5 (defined) G/C = _____/_____ = 0._____

$$q = \frac{DHV}{3600 N} = \frac{\quad}{(3600)(\quad)} = \frac{\quad}{\quad}$$

$$qC = (\quad)(\quad) = \frac{\quad}{\quad}$$

$$x = \frac{qC}{Gs} = \frac{(\quad)(\quad)}{(\quad)(\quad)} = \frac{\quad}{\quad}$$

$$f_1 = \frac{(1 - G/C)^2}{2(1 - q/s)} = \frac{\quad}{\quad}$$

(from: Table 8.20)

$$f_2 = \frac{x^2}{2(1 - x)} = \frac{\quad}{\quad}$$

(from: Table 8.21)

$$f_3 = \frac{(65)(C/q^2)L/3(x^2 + 5(G/C))}{C(f_1) + (f_2)(L/q)} = \frac{\quad}{\quad}$$

(from: Table 8.22)

$$d = (Cf_1 + f_2/q) \left(\frac{100 - f_3}{100} \right) = ((\quad)(\quad) + (\quad)/(\quad)) \left(\frac{100 - \quad}{100} \right) = (\quad)(\quad) = \quad$$

AVERAGE QUEUE NUMBER

Method 1 (no delay factor)

$$n_1 = qR = (\quad)(\quad) = \quad$$

c'

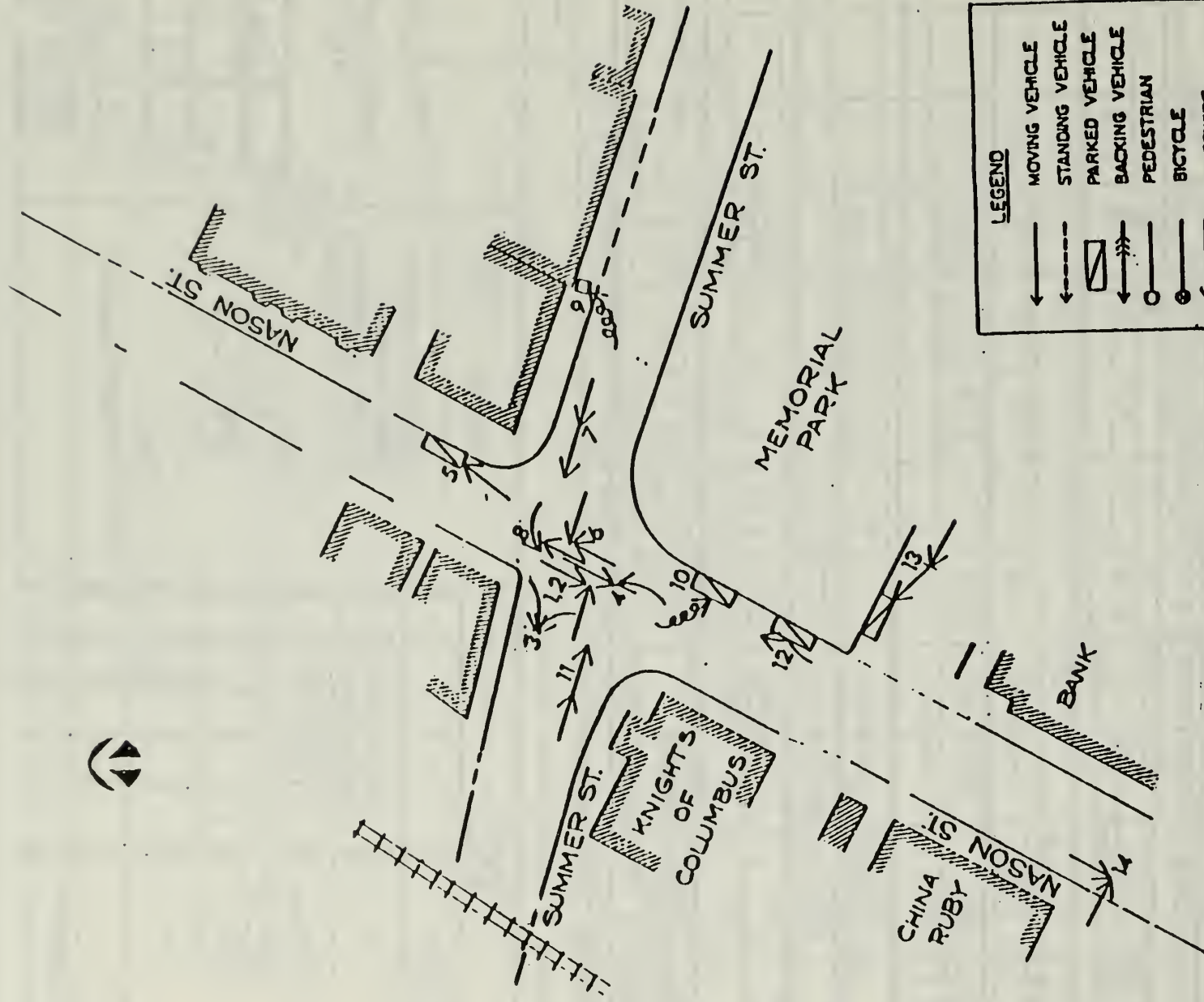
AVERAGE QUEUE NUMBER

Method 2 (with delay factor)

$$n_2 = q \left(\frac{R}{2} + d \right) = (\quad) \left(\frac{\quad}{2} + \quad \right) = \quad$$

d'

z	$\frac{q}{C}$	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0	34.5	35.0	35.5	36.0	36.5	37.0	37.5	38.0	38.5	39.0	39.5	40.0	40.5	41.0	41.5	42.0	42.5	43.0	43.5	44.0	44.5	45.0	45.5	46.0	46.5	47.0	47.5	48.0	48.5	49.0	49.5	50.0	50.5	51.0	51.5	52.0	52.5	53.0	53.5	54.0	54.5	55.0	55.5	56.0	56.5	57.0	57.5	58.0	58.5	59.0	59.5	60.0	60.5	61.0	61.5	62.0	62.5	63.0	63.5	64.0	64.5	65.0	65.5	66.0	66.5	67.0	67.5	68.0	68.5	69.0	69.5	70.0	70.5	71.0	71.5	72.0	72.5	73.0	73.5	74.0	74.5	75.0	75.5	76.0	76.5	77.0	77.5	78.0	78.5	79.0	79.5	80.0	80.5	81.0	81.5	82.0	82.5	83.0	83.5	84.0	84.5	85.0	85.5	86.0	86.5	87.0	87.5	88.0	88.5	89.0	89.5	90.0	90.5	91.0	91.5	92.0	92.5	93.0	93.5	94.0	94.5	95.0	95.5	96.0	96.5	97.0	97.5	98.0	98.5	99.0	99.5	100.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	49.0	49.1	49.2	49.3	49.4	49.5	49.6	49.7	49.8	49.9	50.0	50.1	50.2	50.3	50.4	50.5	50.6	50.7	50.8	50.9	51.0	51.1	51.2	51.3	51.4	51.5	51.6	51.7	51.8	51.9	52.0	52.1	52.2	52.3	52.4	52.5	52.6	52.7	52.8	52.9	53.0	53.1	53.2	53.3	53.4	53.5	53.6	53.7	53.8	53.9	54.0	54.1	54.2	54.3	54.4	54.5	54.6	54.7	54.8	54.9	55.0	55.1	55.2	55.3	55.4	55.5	55.6	55.7	55.8	55.9	56.0	56.1	56.2	56.3	56.4	56.5	56.6	56.7	56.8	56.9	57.0	57.1	57.2	57.3	57.4	57.5	57.6	57.7	57.8	57.9	58.0	58.1	58.2	58.3	58.4	58.5	58.6	58.7	58.8	58.9	59.0	59.1	59.2	59.3	59.4	59.5	59.6	59.7	59.8	59.9	60.0	60.1	60.2	60.3	60.4	60.5	60.6	60.7	60.8	60.9	61.0	61.1	61.2	61.3	61.4	61.5	61.6	61.7	61.8	61.9	62.0	62.1	62.2	62.3	62.4	62.5	62.6	62.7	62.8	62.9	63.0	63.1	63.2	63.3	63.4	63.5	63.6	63.7	63.8	63.9	64.0	64.1	64.2	64.3	64.4	64.5	64.6	64.7	64.8	64.9	65.0	65.1	65.2	65.3	65.4	65.5	65.6	65.7	65.8	65.9	66.0	66.1	66.2	66.3	66.4	66.5	66.6	66.7	66.8	66.9	67.0	67.1	67.2	67.3	67.4	67.5	67.6	67.7	67.8	67.9	68.0	68.1	68.2	68.3	68.4	68.5	68.6	68.7	68.8	68.9	69.0	69.1	69.2	69.3	69.4	69.5	69.6	69.7	69.8	69.9	70.0	70.1	70.2	70.3	70.4	70.5	70.6	70.7	70.8	70.9	71.0	71.1	71.2	71.3	71.4	71.5	71.6	71.7	71.8	71.9	72.0	72.1	72.2	72.3	72.4	72.5	72.6	72.7	72.8	72.9	73.0	73.1	73.2	73.3	73.4	73.5	73.6	73.7	73.8	73.9	74.0	74.1	74.2	74.3	74.4	74.5	74.6	74.7	74.8	74.9	75.0	75.1	75.2	75.3	75.4	75.5	75.6	75.7	75.8	75.9	76.0	76.1	76.2	76.3	76.4	76.5	76.6	76.7	76.8	76.9	77.0	77.1	77.2	77.3	77.4	77.5	77.6	77.7	77.8	77.9	78.0	78.1	78.2	78.3	78.4	78.5	78.6	78.7	78.8	78.9	79.0	79.1	79.2	79.3	79.4	79.5	79.6	79.7	79.8	79.9	80.0	80.1	80.2	80.3	80.4	80.5	80.6	80.7	80.8	80.9	81.0	81.1	81.2	81.3	81.4	81.5	81.6	81.7	81.8	81.9	82.0	82.1	82.2	82.3	82.4	82.5	82.6	82.7	82.8	82.9	83.0	83.1	83.2	83.3	83.4	83.5	83.6	83.7	83.8	83.9	84.0	84.1	84.2	84.3	84.4	84.5	84.6	84.7	84.8	84.9	85.0	85.1	85.2	85.3	85.4	85.5	85.6	85.7	85.8	85.9	86.0	86.1	86.2	86.3	86.4	86.5	86.6	86.7	86.8	86.9	87.0	87.1	87.2	87.3	87.4	87.5	87.6	87.7	87.8	87.9	88.0	88.1	88.2	88.3	88.4	88.5	88.6	88.7	88.8	88.9	89.0	89.1	89.2	89.3	89.4	89.5	89.6	89.7	89.8	89.9	90.0	90.1	90.2	90.3	90.4	90.5	90.6	90.7	90.8	90.9	91.0	91.1	91.2	91.3	91.4	91.5	91.6	91.7	91.8	91.9	92.0	92.1	92.2	92.3	92.4	92.5	92.6	92.7	92.8	92.9	93.0	93.1	93.2	93.3	93.4	93.5	93.6	93.7	93.8	93.9	94.0	94.1	94.2	94.3	94.4	94.5	94.6	94.7	94.8	94.9	95.0	95.1	95.2	95.3	95.4	95.5	95.6	95.7	95.8	95.9	96.0	96.1	96.2	96.3	96.4	96.5	96.6	96.7	96.8	96.9	97.0	97.1	97.2	97.3	97.4	97.5	97.6	97.7	97.8	97.9	98.0	98.1	98.2	98.3	98.4	98.5	98.6	98.7	98.8	98.9	99.0	99.1	99.2	99.3	99.4	99.5	99.6	99.7	99.8	99.9	100.0



Accident Map

Maps should be accompanied by a table that describes for each accident:

- Day of Week
- Date
- Time of Day
- Light/Dark
- Roadway Conditions
- Severity (property damage/personal injury/fatality)
- Any other pertinent data available

Method of Hazard Index
Calculation

Hazard Index Formula

$$\text{Hazard Index (HI)} = E \text{ (ACC)}$$

Where: E = Exposure

Case 1: If Average Daily Traffic
(ADT) = 15000 vehicles,
then E = -0.0319 ADTT +
3.594

Case 2: If Average Daily Traffic
(ADT) 15000 vehicles, then
E = -0.0784 ADTT + 4.095

Where: ADTT = Average Daily Traffic in thousands of vehicles
per day.

and ACC = average annual number of adjusted accidents over an
n year period.

Motor vehicle accidents are classified into three types: P,
N, or F where P signifies a property damage accident; N is a
personal injury accident; F signifies a fatality. ACC repre-
sents the average number of accidents per year weighted
according to accident severity where P is worth 1 point; N is
worth 10 points; and F is worth 100 points.

Therefore,

$$\text{ACC} = \left[\frac{\text{number of P}}{n \text{ years}} \times 1 \right] + \left[\frac{\text{number of N}}{n \text{ years}} \times 10 \right] + \left[\frac{\text{number of F}}{n \text{ years}} \times 100 \right]$$

1 according to the latest Mass Registry of Motor Vehicles
format, the designation N has been replaced by the letter I.

Design vehicle type	P	SU	BUS	WB-40	WB-50	WB-60
Minimum turning radius (feet)	24	42	42	40	45	45
Minimum inside radius (feet)	15.3	28.4	20.3	19.9	19.8	22.5

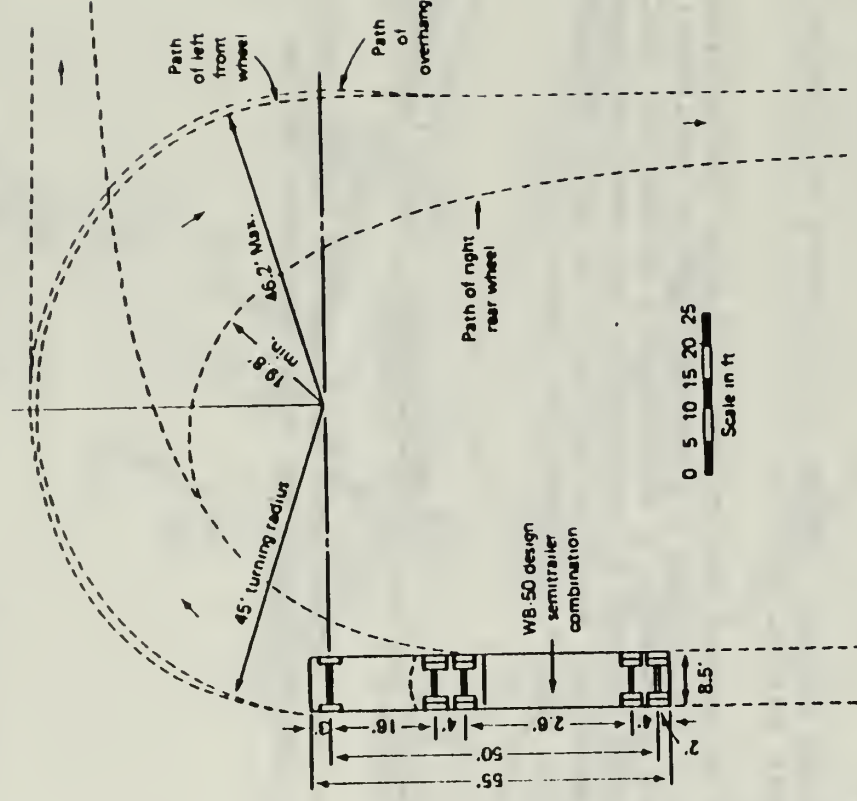


Figure 14.2. Minimum design path of typical design truck (WB-50 design vehicle).
[Source: *A Policy on Geometric Design of Rural Highways* (Washington, D.C.: American Association of State Highway Officials, 1965), p. 84.]

Minimum turning radii for use
in designing town center intersections.

Vehicles covered are:

P= passenger car
SU= single unit truck (usually be
design vehicle)

BUS= bus

WB-40, 50 & 60 = semi trailer combination
vehicles of wheel bases
40, 50 and 60 feet respectively.

URBAN DESIGN

DESIGN REVIEW PROCESS

Local/Project Committee - Merchants Group

This is an implementation program that requires no funding. In working with design guidelines, merchants and public officials can work together to develop and promote effective design guidelines. The following is a method for establishing a design review process.

1. Contact the office designated to handle the review process, usually the planning department or building inspector, and inquire about the design guidelines and the review process. Pick up a copy of the "Design Guidelines" information brochure.
2. Develop Preliminary design using the guidelines and your architect, designer, or other consultants.
3. Schedule a meeting with a representative from the review office to present your preliminary design and receive comments and suggestions. Pick up a design permit application for a sign, storefront, or new construction.
4. Proceed with plans incorporating comments from the review office.
5. Submit construction documents to building department for approval. Attach completed design-permit application for sign, storefront, or new construction.
6. Building department reviews plans according to codes, zoning, etc. The review office evaluates plans for conformance to mandatory design guidelines.
7. Application for building permit approved or rejected. Design permit application for sign, storefront, or new construction approved or rejected.
8. If both permits approved, construction may begin. Owner or businessman will investigate available incentive programs.

HISTORIC PRESERVATION TERMS

Below is a list of preservation terms used in seeking funding or historic designations.

- . Restoration means returning a building as nearly as possible to its original state.
- . Rehabilitation means making the building useful or habitable again.
- . Renovation means upgrading the building.
- . Reconstruction means re-building the structure, usually from the ground up, with new materials.
- . Adaptive Use is the rehabilitation of structures of use other than that for which they were first designed. Architectural integrity is retained as much as possible, while interior space can be modernized to meet the needs of new occupants.
- . Facade Easements is a preservation process in which a government agency or private group can purchase or receive by donation, the "less than fee" title to a property. Essentially, this means the exterior of a building is sold to new owners for 10 to 20 percent of the property's value. The owner of the facade may then impose certain restrictions regarding the building's appearance. The value of this type of activity is in: 1) the preservation of the historic fabric of a structure with a minimum limitation on property use, and 2) acquisition of a facade easement, which is cheaper than purchasing the entire building.
- . Transfer of Development Rights (TDR) Many times the land on which an historic property is located is much more valuable than the building itself. A classic example is in large cities where the income that could be generated from skyscraper is many times greater than the historic value of an old building. Under TDR, development rights are shifted to a nearby non-historic property. A new building is allowed to be built to a level exceeding density or height normally permitted.

The value of TDR is that it may apply to a low density area with development pressures. It also keeps landmarks in private ownership while preserving public access.

- Revolving Funds are generally operated by private preservation groups or foundations. The operating group buys an historic building and resells it to a new owner willing to renovate. Income generated by the sale is then put back into the fund along with new donations.

The advantages of revolving funds are that government involvement is minimized and the property remains in private hands with safeguards. The disadvantages are that it assumes a group already exists to raise money and get the project off the ground. It also presumes that there is or will be a local market for historic buildings.

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